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CONTENTS.

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POINTS FOR PRODUCERS.

Mange in Horses.

The appearance on a 12-year-old draught mare of a patch on the top of the wither, extending down the shoulders, with the loss of hair and formation of a thick scale, the growth of grey hair, and subsequently the appearance of similar patches on the flanks and belly, has prompted a correspondent to seek advice as to cause and cure. The Veterinary Lecturer states that the symptoms quoted point to a bad form of mange, and he suggests the following treatment:—Stand in sun for half an hour, lather over with soft soap, let lather dry on; an hour later wash off with soda and water. When dry dress with benzine one part, olive oil four parts. Repeat dressing once a day, repeat washing once a week. If very obstinate, rub small quantity of blue mercurial ointment into the thickened scaly parts. Remember, the disease can spread over the body and to other horses.

Fire.

The luxuriant growth of vegetation which has characterised this year renders it necessary that more than ordinary vigilance should be exercised to prevent damage from fire. It is to the interests of landholders themselves that the provisions of the Bush Fires Act of 1913 should be strictly observed.

This enactment provides that stubble must not be burnt between October 16th and January 31st, both dates inclusive, but firebreaks for stubble burning may be lighted during that period, after the following conditions have been observed:—1. The strip is not to be less than 2 chains nor less than ½ a chain wide. 2. Before lighting the fire the land alongside the strip to be burnt is ploughed to a width of 3ft., or cleared of all scrub, stubble, and other inflammable material to a width of 5ft. 3. Twenty-four hours' notice to be given to owners and occupiers of adjoining land if resident within five miles of the place intended to be burnt. 4. Four men must be present at the fire. 5. No such fire is to be lighted before 9 o'clock in the morning, and it must be extinguished by 9 o'clock at night. The burning of firebreaks or of stubble on Crown lands held under lease, agreement, or licence must, in addition to the foregoing, be preceded by 24 hours' notice to the nearest Crown lands ranger or police constable. Stubble may be burnt between February 1st and October 15th, both inclusive, under conditions 2, 3, and 4 above mentioned. No fires are to be lighted for stubble burning on a Sunday. Penalty £2 to £50.

Scrub burning between October 16th and January 31st, both dates inclusive, is strictly prohibited. Penalty, £5 to £50.

Scrub burning between February 1st and April 30th, both dates inclusive, requires the following precautions:—1. Fifteen feet round the area to be burnt must be ploughed or cleared. 2. Twenty-four

hours' notice must be given to adjoining landholders residing within five miles of the place intended to be burnt. 3. Four men must be present during the burning. 4. The fire must not be lighted before 9 o'clock in the morning. The burning of scrub, in addition to the foregoing, on Crown lands held under lease, agreement, or licence must be preceded by 24 hours' notice to the nearest Crown lands ranger or police constable in addition to any other notice. No fires are to be lighted on Sunday for scrub burning. Penalty, £2 to £50.

It is also advisable to note that smoking is prohibited within 20yds. of any stable, rick, stack, or field of hay, straw, stubble, or other inflammable vegetable, from November 1st to April 30th, except within a town, or with a pipe properly covered. Penalty, £1 to £10.

Undesirable Aliens.

The year just closed, characterised as it was by a most luxuriant vegetative growth throughout practically the whole State, has not passed without producing its crop of undesirable weeds. At least three plants hitherto unreported in South Australia have been found flourishing. The "flea seed" (*Plantago Psyllium L.*) was first reported in last month's issue of the *Journal*, as also was the appearance of the poison hemlock (*Conium maculatum L.*). Another stranger to this State has now been identified by Professor T. G. B. Osborn, M.Sc., as *Allium rotundum*, a wild garlic from Southern Europe. This plant will spread by means of its seed, in addition to bulbils, and the Professor of Botany suggests that the best means of effecting its destruction would be to dig up and burn the whole, taking care not to scatter the bulbils around the main bulb. The occurrence of these unwelcome strangers only goes to emphasize the necessity for landholders keeping a sharp lookout for their appearance. Had they been taken in time, few, if any, of the plant pests which now cause such trouble in Australia would have offered much of an obstacle to the individual landholder or to the State; but some have secured such a hold that their eradication is an economic impossibility, certainly to the individual, and probably to the State. The greater the efforts made to restrict this class, the better for all concerned.

Water for Poultry.

The water content of the body of a fowl is 65 per cent.: this shows that fowls, to be kept in health, must have water, so that all the organs of the body can function normally. At all times there should be an ample supply of clean, cool water, shaded from the rays of the sun, in a thoroughly clean vessel, and so placed that it is free from contamination. Dirty water vessels make a fine breeding ground for various disease organisms. Ducklings must have drinking water day and night. Thirsty ducklings will drink too much water, which affects the brain and so causes staggering and speedy death. Scald the water vessels frequently, and disinfect with a solution of bluestone (copper sulphate) 2oz. to 1gall. water. N.B.—This is poisonous.—D. F. Laurie, Poultry Expert.

Ringing Fruit Trees.

The practice of removing a complete ring of bark from fruit trees was referred to in the December issue of the *Journal*, mention being made of the results of experiments conducted at the New York Experimental Station. The noticeable improvement in the bearing of oranges in South Australia was also remarked. Apples also have been subjected to ringing in South Australia, and Mr. W. H. Hughes, of Longwood, practised the system on some trees of the Nickajack variety some ten years ago. That grower put two cuts, ¼in. apart, through the bark of the trees, and removed the strip between the cuts. The operation was performed when the blossom began to fall. It was important, Mr. Hughes considered, that the cuts should not be deeper than through the bark, and if the weather were warm, he advised tying a strip of bagging over the wound to protect it from the rays of the sun. At the time the first test was made, one tree of a lot of eight was chosen for treatment. The treated tree yielded more fruit the season directly after treatment than was gathered from the remaining seven untreated. Needless to say, these were subjected to ringing the next year. All the treated trees are still bearing well. However, Dunn's Seedlings were also treated, but not successfully.

Mr. J. Roebuck, also a member of the Longwood Branch of the Agricultural Bureau, ringbarked a Gravenstein apple in the limbs ten years ago. Prior to treatment it had not averaged a return of one case per year, but immediately succeeding the ringing it yielded 13 cases, and since then has returned an average of nine cases annually.

A vigorous growing Northern Spy apple was ringbarked by Mr. W. Nicholls, and the result was very satisfactory.

GROWING ALMOND KERNELS.

"The pits or stones of all stone fruits should be planted in this climate as soon as the ground receives its first soaking in winter," says the Horticultural Instructor (Mr. George Quinn), in reply to an inquiry in relation to growing almond kernels. "They should be covered with loose soil to a depth varying from 1½in. to 3in., and the surface of this should again be covered with an inch of mulch or litter or short manure before the ground has had time to dry out and become encrusted in the spring. Almonds as a rule come up freely in the early spring if planted as described above—that is, they may be expected to appear in three or four months from planting. If the season is advanced the kernels only may be set out; but, of course they should not be split or crushed badly. It may be remarked that one could hasten the germination of the nuts by burying them in a box of moist sand in the summer, say, in March, and keep this moistened until planting time, when they can be carefully shifted out. This will tend to soften the sutural joint of the two holes of the nut, and cause it to admit moisture to the kernel, which contains the germ just inside its tapered end."

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture*, Adelaide."

VETERINARY INQUIRIES.

[Replies supplied by Mr. F. E. Place, B.V.Sc., M.R.C.V.S., Veterinary Lecturer.]

[Extraordinary pressure on space has rendered it necessary to very considerably curtail the inquiry department. Replies to those questions of more general interest only have been published; however, every query received has been replied to through the post.—Ed.]

"V. M.," Parilla, has foal troubled with soreness at mouth and coronets; pus, and likelihood of losing hoofs.

Reply—This form of acute stomatitis occasionally attacks foals, and it is quite possible that the hoofs will slough, but will be renewed in time if it is worth while keeping the foal about. Treatment—As much tartar emetic as will lie on the point of the small blade of a penknife twice a day on the tongue, and dress the sores with dry boracic or a solution of Condy's crystals. Treatment may be discontinued after a week and repeated later for another week if necessary.

"A. C. G.," Lameroo, has a foal, three months, with crooked legs.

Reply—These will improve as time goes on. Give a tablespoon of syrup of phosphate of iron twice a day for a month or so. The foal will probably take it mixed in a little crushed oats, or if it has to be drenched, in a little honey and water. The swelling under the jaw will probably disappear in time.

"W. M.," Moorlands, writing in regard to Mid-York. pigs, asks:—Are there two types? Would a straight nose condemn? Do small blue-black spots on the under hair prove the pig is not pure bred?

Reply—As the middle white is derived from the large and small, there are the two types which favor the one or the other, generally leaning towards the large. The nose of the middle white is judged to be more turned up than that of the large. In the large black spots are grave objections, in the small blue spots are looked upon as a sure indication of a cross, so in the middle they would be looked upon with great suspicion.

"C. J. D.," Harrogate, has a Jersey cow, 8 years, with lump at back of udder size of hen's egg. At first calf (2½ years) was very stiff behind. At second calf lump was first noticed about as big as an almond, and disappeared under iodine treatment. With fourth calf is as big as egg. No pain, and not noticeable when cow is dry. Not yielding to iodine.

Reply—An enlargement of supramammary gland, with an interesting history, because it points to tubercolosis or actinomycosis, probably the former. As there is suspicion of such a disease it is necessary for you to report it to the Chief Inspector of Stock, Adelaide, who will send an officer to report after investigation. In the meantime the cow should be isolated from others, and the milk boiled well before being used even for pigs.

Unsigned letter, Stansbury, writer has a mare 18 years, with greasy heels while suckling.

Reply—A tablespoon of Fowler's solution of arsenic once a day in feed for three weeks. The juice of half a lemon applied to the heels daily. Regret we cannot reply direct owing to want of signature to letter.

"C. M. W.," Netherton, seeks information in regard to foals dead at birth, or dying soon after.

Reply—This year there has been a regular epizootic of a disease known under various technical names, such as *Omphalothrombophlebitis pyelitis*, and so forth, which is caused by a septic germ attacking the foal in the womb and upsetting its constitution; should it be born alive it generally develops abscesses of the navel or joints so that the disease is then called navel or joint ill. Under those names it has frequently been referred to in these replies recently. Little can be done to prevent its occurrence, as the mares show no definite symptoms to the layman's eye, and a preventive inoculation would require the constant presence of a trained veterinarian. Fortunately, when it has been rife in one year, it is seldom so for some to come. The last serious outbreak in this State was about six years ago.

"J. B. M." advises that a calf was born blind, with thick, dark skin over eyes; very weak and small.

Reply—There is probably congenital disease which has caused the blindness, and treatment is not likely to be profitable, but if so inclined relief may follow the daily application of a solution of nitrate of silver in distilled water; strength 2 grains to 1oz.

"J. B. M." also has a cow which does not thrive though on good feed; very poor, and not much milk.

Reply—The symptoms are too indefinite to give an opinion on, but they are somewhat like those of tuberculosis, and it would be well to advise the Chief Inspector of Stock, Adelaide, who would send an officer to investigate.

"P. W. H.," Murat Bay, reports that a horse (buggy) hung back, reared, fell backwards, tried to get up, but scrambled along with nose on ground like a beast shot a bit too low. When bleeding at nose stopped, got up, staggered, and eyes dilated as if blind. In dark they glared, lifts legs very high, and smells way; does not seem to see light at night, but if held very close winks very slightly.

Reply—An excellent description of injury to the base of the skull from striking the ground with the poll. The blindness may be permanent, but is likely to disappear in a few weeks if the nerves themselves have not been injured. Treatment—Turn out in a shady paddock for three months, and if fed, give 10 drops tincture arnica once a day for three weeks.

CHICKEN POX.

The occurrence of scabs on the beak and mouth of chicks prompted a correspondent to seek information on this matter. He reported that the trouble eventually extended to the eyes, the birds subsequently dying.

The trouble is known as chicken pox—a fungoid parasitic affection—air borne, says the Poultry Expert (Mr. D. F. Laurie). Treatment consists in bathing the affected parts with vinegar and water, equal parts. After drying with rag, one of the following mixtures should be applied:—1. Carbolized glycerine, 5 per cent.; or 2. Iodoform 1, vaseline 20 parts. All birds should be given some Epsom salts in drinking water, a tablespoonful to 1 gall. water.

A preventive measure is to apply kerosine 1, olive oil 4 parts, with rag, to the head, comb, and wattles of all birds.

ON THE SCOPE IN SOUTH AUSTRALIA FOR THE EXTENSION OF OLIVE GROVES.

AN OPENING FOR THE EMPLOYMENT OF RETURNED SOLDIERS.

[By ARTHUR J. PERKINS, Director of Agriculture.]

I.—INTRODUCTORY.

Quite recently attention has been called in the press to the desirability of employing returned soldiers in extending our olive plantations. The general question of taking advantage of natural conditions eminently adapted to olive-growing, has within recent years been much in my mind; whilst on the other hand, over past months I have been endeavoring to formulate various schemes which should lead to the profitable agricultural employment of returned soldiers. Hence it is from both these points of view that I now have the honor to submit the following notes and suggestions.

In the first place, I feel that I must preface these remarks with the statement that although I can lay no claim to being an expert, I am able to speak of olives and olive trees from the standpoint of some degree of personal experience. And I do this because I wish to make it clear that my views, whether right or wrong, are not merely the results of untested theoretical musings. I am, in fact, relying both on my knowledge of local conditions, and on personal experience acquired in earlier years in Mediterranean countries, in which for many centuries the olive tree has proved a source of inexhaustible agricultural wealth.

II.—LOCAL POSITION OF THE INDUSTRY.

What is the position locally? Excellent, one would imagine, from the standpoint of our oil-makers, with oil at 13s. per gallon, wholesale rates; absolute stagnation, on the other hand, from the point of view of the State. And as an advocate of the extension of olive-growing in South Australia, on the broadest and widest lines possible, I shall have to show that both the individual and the State stand to gain much by it.

Briefly speaking, I am satisfied that whilst we have gone to the length of proving the complete adaptability of the olive tree to local

climate and soil, we have not yet given it the slightest opportunity to demonstrate its great economic value. And unquestionably, the fact that olive trees do not come into reasonable bearing until their tenth and twelfth years is mainly responsible for their consistent neglect by a people whose inherited habits do not include olive oil among the necessaries of life.

Our unsympathetic treatment of the trees is perhaps another factor which has kept in check any tendency towards healthy expansion. We seem to have imagined that the olive tree could be grown to commercial advantage under what may be termed ordinary forest treatment, whilst we have overlooked the fact that it is essentially a tree of the orchard or cultivated grove; and that for commercial success it demands both regular tillage and individual cultural attention. Unfortunately, however, many among us who, in moments of temporary enthusiasm, have attempted to grow olive trees, have certainly not realised these facts; and their ill-success must have acted as a deterrent upon others. If the olive tree is ever to become a powerful economic factor in our midst, we must endeavor to forget that we ever tortured it into a hedge plant, or systematically neglected it as a forest tree. We must, in fact, be prepared to put work into the land which carries the olive tree.

III.—ADAPTABILITY AND GENERAL HARDINESS OF THE OLIVE TREE.

Although olive trees thrive in good, deep, rich soils, and under favorable conditions of rainfall, it is not in conditions such as these that we are likely to derive maximum economic advantage from them. Wherever natural conditions are abundantly favorable to general agricultural operations there is no need to call in olive trees to the rescue. On the other hand, the exceptional hardiness of olive trees when faced with abnormal heat and drought is often overlooked; indeed, there is probably no other cultivated plant that is equally drought resisting. I do not, however, wish for a moment to imply that the fruit yields of olive trees are equally heavy in years of drought and in those of plenty. Such, indeed, is very far from being the case; at the same time, whilst extreme drought may at times compromise the yearly crop, the trees themselves, nevertheless, given intelligent treatment, do not suffer to an appreciable degree, and speedily return to normal yields so soon as drought conditions tend to fade away. It is the reasoned recognition of this fact that has placed the great olive groves of Tunisia, with which I am personally acquainted, not in the north, where rainfall conditions are satisfactory and cereals are grown to advantage, but in the

south, almost on the border of the Sahara Desert, where cereals cannot be grown to any great extent.

Hence I am of the opinion that if we are to take full advantage of the economic possibilities of the olive tree, it is chiefly in districts of uncertain rainfall that we should endeavor to establish it—in those districts in which farmers are regularly and periodically compelled to struggle with more or less droughty conditions of climate. I believe the olive tree to be very well adapted to conditions obtaining over the *central and northern hundreds of Eyre's Peninsula, over the mallee hundreds of counties Buccleuch and Chandos, and those of the Murray Valley; in fact, in any of our light rainfall cultivated mallee districts in which the soil is adequately provided with lime.*

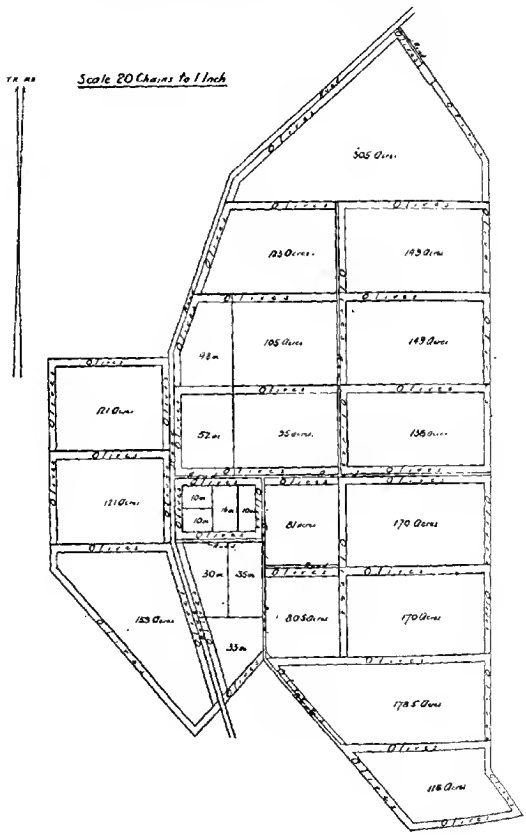
IV.—THE LAYING OUT OF OLIVE GROVES.

In most olive-growing countries it is customary to lay out the groves on very much the same lines as our own orchards, only on a larger scale, *i.e.*, in more or less regular compact blocks. In some cases the olive trees are systematically associated with other crops, such as cereals, vines, etc.; in others again their screening and sheltering powers are turned to the advantage of more delicate types of vegetation.

What is likely to be the best policy for us here in South Australia? In this connection I believe that we should endeavor to extract from our olive plantations every possible advantage they can offer. Nor can I see any particular advantage in building up with care a small coterie of olive growers, however valuable to the State their individual efforts may be. I am persuaded that every farmer in the districts I have mentioned above could and should associate olive-growing with his other normal pursuits. In the circumstances, therefore, we can ask from the olive tree something more than the mere production of fruit, however profitable the latter may be. We are all conscious that with us settlement of the country has hitherto meant little less than the indiscriminate felling and burning of all timber in sight; and it is much to be feared that before many generations have sped by ours will be a comparatively treeless country. Even now when the mallee farmer has finally subdued the bush, and finds his land more or less wheat-sick, his subsequent endeavors to associate livestock with the growing of crops are hampered by the complete absence of natural shelter of any kind; and his livestock operations suffer in proportion. I believe that a judicious use of the olive tree would go a long way towards remedying this evil. How this can be done I am endeavoring to illustrate on the Eyre's Peninsula Experimental Farm, at Minnipa. The

accompanying illustration shows not what has been done, but what we propose doing, and are indeed gradually endeavoring to do. It will be noted that we purpose surrounding each field with a regular belt of four rows of olive trees, planted 40ft. apart; this will give us

Eyre's Peninsula Training Farm
Subdivided into Fields, bordered with 4 rows of
Olive trees 40 feet apart = 5200 acres.



eventually 520 acres of olive trees on a farm about 3,000 acres in area. Hence, instead of square or rectangular groves, we shall have long, narrow ones, acting as shelter and windbreaks throughout the length and breadth of the farm. It is quiet true, of course, that from this point of view a couple of rows of trees might prove almost equally effective; in the case of the smaller number, however, a fatal tendency to neglect tillage operations whenever the field itself was out of cultivation would generally make itself felt; and since both yield and profitableness of olive trees are always proportional to the care bestowed upon them, such neglect would in the long run tell against any important extension of the industry. In brief, I feel convinced that whilst four rows of trees, covering a depth of 160ft., would be looked upon as a regular grove, and tilled accordingly, there is danger that two rows would in time degenerate into mere breakwinds, and be neglected accordingly.

It will probably be objected that the fencing off of these long, narrow strips will prove tolerably costly, relatively to more compact blocks. This undoubtedly will be the case; it should not be overlooked, however, that we are asking the olive trees to play a double role, namely, to produce olives on the one hand, and to develop shelter for livestock and crops on the other. In any circumstances, when a breakwind is planted around a field, one cannot avoid protecting it by a double line of fencing; this is part of the price we pay for its shelter. In our particular case the breakwind happens to present the advantage of being directly reproductive; and if an objection is to be made of the unavoidable cost of fencing, we shall be compelled to ask, by way of rejoinder, whether the establishment of breakwinds is to be considered essential to progressive farming or not? Personally, I have no doubt as to what is the only possible answer.

V.—STATE MEASURES ESSENTIAL TO THE DEVELOPMENT OF THE OLIVE OIL INDUSTRY.

In a country such as ours, with no past agricultural traditions in the background, the years of patient waiting which the would-be olive grower cannot hope to avoid must form an insurmountable obstacle to any appreciable local extension of the industry; and particularly so in those districts which it is best calculated to serve. Hence, in my opinion, notwithstanding the admitted existence of excellent local natural conditions and the undeniable prospects of great economic good, we cannot hope ever seriously to develop into an olive-growing people, except under the stimulus of very definite and very vigorous State action. What shape and what direction State action should take in this connection remain yet to be considered.

1. It would be much to the advantage of the State if olive-growing could be forced upon new districts in which it is as yet unknown, and in which it would prove a standby to settlers both in prosperity and adversity. Now, it appears to me that in cases of this kind the first assurance that the would-be planter will look for must have reference to the adequate marketing of his fruit, when in the distant future his trees come into bearing. Hence, if Government is duly impressed with the real economic value of the olive tree, and is anxious to secure its practical recognition by settlers, the very first step to be taken should cover a binding guarantee to planters that they will not be faced with marketing difficulties when, after many years, their trees come into bearing. I fail to see that appreciable planting can be anticipated unless some such guarantee is given. I suggest that Government should undertake that *in any new district in which olive-planting is taken up on an appreciable scale, the fruit, when available, will be taken over at full market rates for crushing in State factories, if the facilities of private enterprise were to prove inadequate to the purpose.* And should effect be given to such an undertaking, it would result not only in supplementing advantageously existing manufacturing facilities, but additionally, it would put a check on undue depreciation in prices of the raw material which always follows lack of competition among manufacturers.

Further, in districts in which the olive plantations are unavoidably distant from State or private factories, special railway concessions should be made for the carriage of ripe olives.

2. *I suggest that Government offer to new planters a yearly bonus of 10s. to 20s. per acre planted until the trees attain their tenth year.* This bonus should be allotted at the end of each season, say, in March, and only subject to the issue of a certificate from the Department of Agriculture to the effect that the olive groves have, in the first year, been well and carefully laid out and adequately protected against live-stock and vermin; and, in the second and subsequent years that the olive trees are being regularly submitted to such tillage and cultural attention as the Department may prescribe from time to time. The slightest neglect in any direction should lead to the immediate withdrawal of the bonus.

VI.—SYSTEMATIC PLANTING OF OLIVE GROVES UNDER STATE CONTROL.

It seems probable that proposals such as these will induce a few new settlers to take up olive-growing on a limited experimental scale: and whilst I hope that wherever conditions are suitable, Government farms will be able to show the way in more adequate manner, I cannot antici-

pate that the industry is likely to receive therefrom for many generations to come an impulse calculated to convert us into an olive-growing community in the course of a few decades. And if we have any faith in the industry, it is some such ideal we should always endeavor to keep before us. Hence, it is with this object ultimately in view that I very respectfully submit the following concrete scheme, *with which, in my opinion, could with very great advantage be associated returned soldiers, so soon as they become available in sufficient numbers for the purpose.* For the sake of clearness, I have summarised the details of the scheme in a series of propositions.

(A) Encircling Belt to be Reserved Around Future Sections.

In the case of all future allotments of land in mallee districts, or in other districts suitable for olive-growing, the Crown to reserve the absolute right to resume, on 12 months' notice, a belt of land encircling the section to a depth of not more than 400ft. from boundary fences. Provision would naturally be made to allow owner of land usual right of way to and from his property through the encircling belt.

(B) Encircling Belt to be Gradually Planted to Olive Trees.

When the maximum area is resumed it is proposed that this belt of land should be planted to 10 rows of olive trees running parallel to the boundary fences; or to a less number of rows, if circumstances rendered it advisable to resume less land.

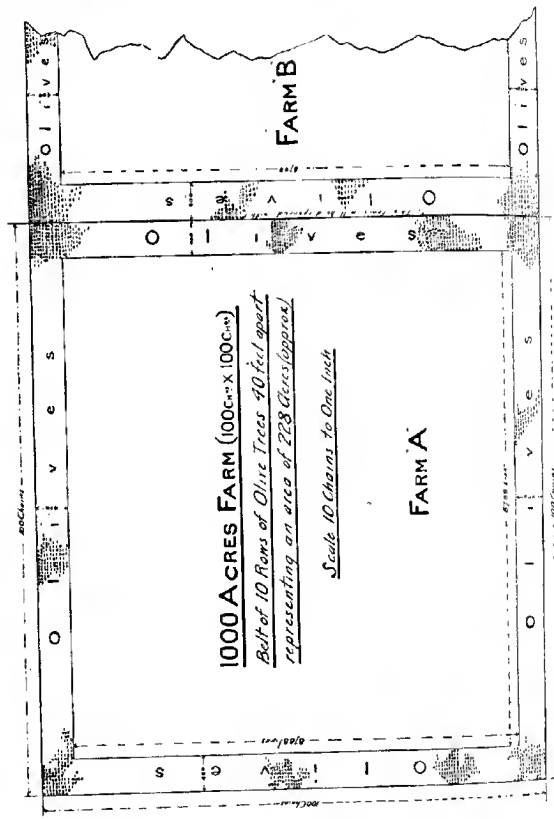
The ultimate aim, therefore, would be to surround all mallee farms with a complete belt of revenue producing and shelter yielding olive trees

If we assume a 1,000 acre farm to be a regular square (100 chains x 100 chains) an encircling belt of 10 rows of olive trees would cover an area of about 228 acres, exclusive of right-of-way outlets. This is illustrated on the accompanying diagram. In cases of adjacent farms, contiguous belts would be 800ft. deep, and include 20 rows of trees; and the cost of the central dividing fence would be avoided.

(C) Deep Encircling Belts Effective Against Wind, but less so than Field Breaks.

Broad belts of this character completely encircling farms will not perhaps afford shelter as complete and satisfactory as the shelter I anticipate from the narrower belts surrounding the individual fields of the Eyre's Peninsula Experimental Farm. At the same time the State could hardly be expected to surround individual fields with shelter belts; such an undertaking would be both costly and inconvenient. I feel satisfied, however, that if individual farms in large districts are

regularly separated one from the other by broad belts of olive trees, the violence of local winds will to a very great extent, be broken, and a large measure of protection to both crops and livestock will be insured. It will always remain open to farmers to surround with trees their individual fields, should they think it necessary. Indeed, it may be



suggested that the State forego the right to resume the land if the owner should undertake to surround his individual fields with olive trees on the lines indicated for the Eyre's Peninsula Experimental Farm.

(D) Land to be Resumed Free of Compensation.

The belt of 400ft. surrounding the farm would be held by the owner as an ordinary lease until resumed by the Crown. On resuming such land the Crown would make no payment for improvements, or for increase in unimproved value of the land, except in the case of heavy clearing, the value of which could be mutually agreed upon. Hence, a settler erecting buildings, sinking wells, or scooping out dams within 400ft. of his boundaries would do so at his own risk and without any chance of securing compensation. In special cases the Minister might agree to such improvements being made, subject to the complete alienation of the area concerned; no such improvements, however, would be recognised unless the Minister's sanction thereto had previously been secured.

(E) Fencing to be Done by the State.

The mallee farmer's boundary fence is not, as a rule, of much value; at the same time young plantations, if they are to succeed, must receive adequate protection against both large and small stock. Hence, it appears to me that the burden of providing a double line of sheep-proof fencing must fall upon those who plant the trees, *i.e.*, in this case on the State. As already pointed out, in cases of adjoining farms, the cost of the central line of fencing will be avoided.

(F) Work Involved in Establishing and Maintaining Belt Olive Grove.

I propose that the planting of these olive groves be carried out either directly by the Department of Agriculture, or under its immediate supervision. The initial work involved would be somewhat as follows:—

1. Complete clearing of the area to be planted, including the removal of all stumps and roots.
2. Trench ploughing the land to a depth of from 15in. to 18in., and working it down subsequently to suitable condition for planting.
3. The establishment of small local or central nurseries in which olive truncheons would be rooted, or seedlings raised.
4. Planting operations, and early care of groves.
5. Regular yearly tillage operations and pruning.

(G) These Olive Belts may Obviate the Periodic Necessity of Drought Relief.

I suggest that in normal times the State area under olive trees be gradually increased year by year by resuming and planting belts of land suitable for the purpose; and in the course of time these plantations must acquire the importance of a great national undertaking.

I submit further, however, that this systematic building up of olive groves offers incidental advantages of great value in times of stress. If my suggestions are adopted these plantations will be established chiefly in areas of low rainfall; and when the latter come under the periodic influences of drought, settlers in need of relief could in their immediate neighborhood be set the task of clearing and preparing land for planting. Moreover, so long as established groves continue State-owned, adequate provision will have to be made for yearly cultural operations and upkeep, which could be undertaken at contract rates and under departmental supervision by those whose land the plantations encircled. It is clear that in times of stress regular receipts of this kind are likely to render less necessary applications for drought relief. Finally, as is indicated lower down, it will always be open to adjacent land owners to acquire or to lease groves surrounding their properties and which have come into bearing; and when cereals fail, as they occasionally do, the olive crop will often help the settler out of temporary difficulties.

(H.) Returned Soldiers Might be Employed in Establishing Belt Olive Groves.

I suggest, too, that the laying out of these groves offers a useful means of relief in times when unemployment is rife; and particularly should this be the case in the years that follow the cessation of hostilities. We must anticipate that in these times many will be in search of employment, whilst suitable avenues can only develop slowly. Many will find it difficult to adapt themselves immediately to former civil avocations; and some transition form of occupation will no doubt prove invaluable. Many, no doubt, notwithstanding their earlier training, will feel attracted to the land and outdoor work; of these we cannot hope that more than a small minority will develop into permanent settlers; a large proportion, it is to be feared, will, after due trial, be repelled by the comparative loneliness and monotony of country life, and gradually drift back to their original callings. I suggest that much of this restless labor might be occupied to the advantage of both themselves and of the State in building up olive groves on belts encircling land, which would ultimately fall to them, or even to others. In this fashion, returned soldiers, to whom land could not be immediately allotted, or for whom congenial occupation could not at the time be found elsewhere, would be given ample opportunities to realise the inwardness of country occupations, and if, as the glamor wore off, many tended to fall out of the ranks, it would be satisfactory to know that their energies had not been misspent in useless work.

Work of this kind would very largely be nomadic in character; no costly buildings or equipment would be needed beyond what is essential to fit up a periodically shifting camp, and to clear and prepare land thoroughly for the reception of olive plants.

(I) CONDITIONS UNDER WHICH GROVES MIGHT BE WORKED.

Olive groves steadily expanding from year to year in this fashion, will, in the course of time, come to occupy extensive areas of country; and as they gradually come into bearing the question of the best means of utilising them will naturally come up for consideration. In this connection there are various methods of treatment which suggest themselves; those which appear to me less open to objection have been summarised below as follows:—

1. In the first place, failing adequate private means for absorbing the produce of the trees, it will be incumbent on Government to erect State factories and throw them open to all those having olives for sale. This erection of State factories will be equally necessary if local buyers should appear to be taking unreasonable advantage of the absence of competition to reduce prices below profitable level. Further, if the State continued in actual possession of large areas of olive trees in full bearing, the erection of State factories would still be desirable, were it only from the point of view of the handling of the produce of State groves.

2. The State might elect to remain permanent owner of whatever olive groves had been laid out under departmental supervision. Moreover, whether this line of policy were adopted or not, it is quite certain that portion at least of the areas planted must from time to time continue under direct State management; hence the following methods of treatment might, according to circumstances, be suggested for whatever groves the State continued to own:—

(a) The groves might be worked wholly by day labor under departmental supervision; and whilst I do not look upon this proposal as ideal, I recognise that in many instances it will be unavoidable.

(b) Subject always to departmental supervision, the groves might be worked under contract with adjoining farmers. I much prefer this arrangement; it would help to break down any local aloofness that might exist, to create local interest in olive trees, and to open the way to individual local experience in the special requirements of the trees.

(c) The State might agree to lease groves to private individuals, with preference always to adjoining landowners. For the protection of the trees such leases would be subject to stringent supervision clauses. Rentals would be determined on

average net returns, and not on interest on cost of production, which, in view of the piecemeal fashion in which groves would have been built up, must vary much according to circumstances. Whilst an outright sale of the groves would be better calculated to forward the aims we have in view, leasing, when opportune, should always be welcomed as helping to encourage local interest in the industry.

(*d*) Subject always to departmental supervision, the State groves might be worked on the "shares" principle, *i.e.*, in way of payment the State would receive a fair proportion of the crop, to be determined upon definitely when greater familiarity with the industry had been established locally.

3. The State might offer to sell the groves to anybody prepared to purchase them, preference always being given to the owner of adjoining land. Prices asked for should again be based on average net returns. If the industry is to thrive in our midst, it is highly desirable that from time to time the State should be able to dispose of by sale olive groves in full bearing. There is nothing likely to stimulate local interest more than the private ownership of the groves. Nor do I think that in such transactions the State need suffer financial loss, either direct or indirect.

(J) Summary of Proposed Treatment of Groves.

In brief summary, the general treatment of the State-planted groves will vary according to circumstances. In their earlier years, and before they come into profitable bearing, they will in all probability remain, without exception, the property of the State. Wherever possible, they should, during this period, be worked under contract and departmental supervision by adjoining land owners; although probably it would be better that training and pruning should be carried out by departmental trained hands. In isolated spots, or in those in which mutual agreement on the subject was unobtainable, the whole of the work would have to be carried out entirely by departmental gangs and equipment.

When the groves come into bearing, those that can be sold should be sold as opportunity arises; those continuing the property of the State should be leased, or worked on shares, or, when neither alternative is possible, they should be worked on the lines already suggested for young groves in the unproductive stage.

VII.—INQUIRY INTO ECONOMIC CONDITION.

And, finally, what are the prospects of favorable net returns from a very largely extended local area under olive trees? In other words,

from the financial point of view, does olive-growing admit of any important extension in South Australia? Before attempting to deal with this aspect of the question, let me recall that, altogether independently of its solution, an important extension of the area under olive trees must carry in its train a number of incidental advantages, among which we may quote—

1. Much country will be saved from becoming a treeless waste.
2. Drift will be definitely checked within planted areas.
3. Adequate shelter will be provided for crops and livestock in open, wind-swept plains.
4. In times of need, useful employment will be available to those out of work.
5. Applications for drought relief should within the planted areas be reduced to a minimum.
6. *Employment on a large scale will be open to returned soldiers so soon as they are disbanded in large numbers.*
7. The olive groves, by providing constant local employment, will tend to add density to our rural population, and perhaps to help towards the development of village centres and settled rural communities.
8. Olive-growing, by providing additional and, it is hoped, profitable employment, will represent a useful step towards closer settlement, and the ultimate reduction in area of individual holdings.

Apart from questions of shelter and the benefits inherent to the planting of any kind of trees—all of which is of immense importance to us, and cannot with safety be overlooked—the indirect advantages indicated above are more or less contingent on the ability of the trees to carry profitable crops of fruit under climatic and economic conditions obtaining here. Climatic conditions are, beyond question, exceptionally favorable, and need not detain us; economic conditions, on the other hand, which usually dominate net returns, are perhaps more open to cavil. A complete study of the economic questions involved would, I am afraid, occupy more space than can be allotted to it in a report of this kind; moreover, absolutely dependable data are almost unobtainable in the present circumstances; nor can I perhaps claim complete competence in such matters. I shall therefore confine myself to the statement of a few facts which appear relevant to the position.

(A) Position of Olive Oil on the Local Market.

The amount of olive oil locally produced does not nearly cover present Commonwealth requirements, whilst, according to the Commonwealth Statistician, production in the other States is practically negligible. In connection with this aspect of the question, I indicate

below, in Table I., what has been the South Australian olive oil production over the past 10 years.

TABLE I.—*Showing Production of Olive Oil in South Australia (1905-14).*

	Gallons.		Gallons.
1905	17,762	1911	7,817
1906	16,164	1912	3,762
1907	16,954	1913	26,964
1908	12,998	1914	1,680
1909	16,464		
1910	26,340	Mean	14,690

Thus, then, the mean yearly output of olive oil in South Australia, and consequently in the Commonwealth, was represented over the last 10 years by about 15,000galls.; over the same period Commonwealth importations of olive oil from foreign countries amounted to about 45,000galls. per annum, in the teeth of a protective duty of 2s. 6d. per gallon. It must be clear, therefore, that from the point of view of local consumption alone, in a growing country, with constantly increasing demands, such as the Commonwealth, we can without fear expand our present area under olive trees five or six fold. Unfortunately, there is no available estimate as to the approximate area under olive trees in South Australia; but from the average yields recorded, I should say that we probably have within the neighborhood of 1,000 acres under productive trees. And from the point of view of the home market alone, therefore, and on the basis of present Commonwealth consumption, we have ample room for another 5,000 or 6,000 acres of olive trees.

But are we justified in assuming that the present Commonwealth rate of consumption of olive oil is likely to remain stationary? In old olive-growing countries, such as Italy and Spain, in which the area under olive trees runs into millions of acres, from two-thirds to three-quarters of the local production of oil is locally consumed; and whilst as a race we are probably never likely to rival the Latin races as consumers of olive oil, nevertheless, it seems to me more than probable that with a great increase in production, and a general lowering of local prices, local consumption will increase manifold. Nor should it be forgotten that 60,000 odd gallons of olive oil do not nearly represent our annual consumption of edible oils; many other cheaper types, such as cotton-seed oil, are imported in large quantities. Thus in 1914-15 over 300,000galls. of cotton and colza oils, paying 2s. 6d. import duty, were imported into the Commonwealth. The great superiority of olive oil for general table purposes over any other type of oil is generally admitted; and it is only local scarcity and prevailing high prices which keep it back from the multitude. Hence I feel

fairly safe in saying, on the grounds of a probable increased Commonwealth consumption alone, that if within the next 10 years our area under olive trees were to expand into 15,000 to 20,000 acres, there is absolutely no reason to anticipate any local glut of the article.

(B) The World's Imports of Olive Oil.

There is, however, no good reason why we should confine our olive oil output to the limited demands of a local market. The world's requirements of this commodity are very considerable, and its widespread adulteration with cheaper neutral-tasting oils is a sure indication that the demand on the world's markets is in excess of the supply. I have endeavored to summarise the position in Table II., in which have been indicated the importations of olive oil by the principal countries of the world. These figures have reference for the most part to the pre-war decade, *i.e.*, 1904-13.

Table II.—*Showing Average Yearly Imports of Olive Oil by Principal Countries of the World* (1904-13).

	Galls.		Galls.
France	4,821,050	Turkey	173,937
Argentine	4,310,081	Mexico	125,546
United States of America	3,760,945	Sweden	102,010
United Kingdom	3,098,114	Serbia	101,363
Canada	2,520,860	Portugal	77,324
Russia	1,676,500	South African Union	64,872
Germany	1,439,134	Australia	44,440
Italy	1,432,830	Holland	43,328
Austria-Hungary	1,246,874	Ecuador	31,213
Cuba	1,139,031	Japan	23,847
Roumania	922,750	Mauritius	14,035
Brazil	792,792	Denmark	12,955
Chile	671,230	Erythrea	12,619
Belgium	634,113	Tunisia	11,768
Egypt	609,235	Costa Rica	10,572
Bulgaria	577,566	New Zealand	7,461
Switzerland	498,755	Spain	4,185
Uruguay	377,695		
Norway	293,629		
Algeria	184,061	Total world's imports	31,848,720

Thus, then, in summary the world's average yearly imports of olive oil were represented in the 1904-13 decade by about 32,000,000galls. This total, however, represents only a fraction of the edible oils imported by the world, many of which would undoubtedly be replaced by olive oil were it only available in sufficient quantities.

(C) The World's Olive Oil Production.

An accurate estimate of the world's total production of olive oil is less readily made than an estimate of imports or exports; many countries unfortunately register their production statistics very imperfectly, whilst for others no figures at all appear to be collected. We

should not forget, however, that even in South Australia we are not altogether blameless, since, apparently, we have not yet overcome the difficulty of determining the local acreage under olive trees. In connection therefore with data in Table III., it must be pointed out that the areas under olive trees indicated for France, Algeria, Austria, United States of America, Cyprus, and Greece have been roughly calculated from average figures having reference to the total production of olive oil. And it is indeed highly probable that in all these cases the acreage figures are too low, since olives are utilised very extensively for pickling purposes in most of these countries. The acreage under olives in Italy, on the other hand, although official, is unquestionably excessive, since it has been made to include other crops currently grown in promiscuous mixture with the olive trees. Finally, both the area under trees and the production of olive oil indicated for Turkey are no more than rough estimates of my own, based on the available figures of the exports of olive oil. In most Eastern olive-growing countries about three-quarters of the produce of the trees is consumed locally, and no more than one-quarter exported; in the absence of any figures relating to production I have assumed this to be the case for Turkey.

As much as has been possible, all figures given in Table III. have been based on the 1904-13 decade.

TABLE III.—*Showing for the Chief Olive-Growing Countries of the World Acreage Under Olive Trees and Average Yearly Production of Olive Oil*, 1904-13.

Country.	Acreage. Acres.	Olive oil. Galls.
Italy	4,256,547	43,263,090
Spain	3,481,115	48,107,971
Algeria	1,469,369	10,443,300
Greece	1,000,000	12,250,000
Turkey	1,000,000	12,000,000
Tunisia	900,000	6,396,650
Portugal	813,350	3,456,100
France	380,000	2,865,517
Austria	15,000	358,643
United States of America	7,300	259,452
Cyprus	7,000	203,220
Chile	1,000	14,417
South Australia	1,000	14,660
Totals	13,331,672	111,812,990

Thus as far as can be ascertained, the area under olive trees in the world extends between thirteen and fourteen million acres, whilst in the last decade the average yearly total production of olive oil was about 142,000,000galls. If we compare this last total with the total imports of olive oil indicated in Table II., namely, about

32,000,000galls., we shall see that fully three-quarters of the olive oil produced is consumed in the countries in which it is produced.

(D) World's Exports of Olive Oil.

Finally, in order to complete our review of the position, I append, in Table IV., the recorded exports of olive oil from the chief olive-producing countries of the world in the 1904-13 decade.

TABLE IV.—*Showing Average Yearly Exports of Olive Oil from Chief Olive-Growing Countries*, 1904-13.

	Galls.		Galls.
Italy	9,999,040	Algeria	1,324,440
Spain	8,303,118	Portugal	531,623
Turkey	3,004,330	Austria-Hungary	32,388
Tunisia	2,458,200		
Greece	2,054,590		
France	1,519,944	Total exports	29,227,673

Thus the average yearly quantity of olive oil recorded as having been exported by the chief producing countries in the 1904-13 decade—about 30,000,000galls.—corresponds fairly closely to the average yearly total shown to have been imported over the same period of time into the chief consuming countries—32,000,000galls.

(E) The Prospects of an Export Trade in Olive Oil from South Australia.

Finally, we have to consider whether, in the event of local supplies overtaking local demands, we shall find ourselves in a position to compete successfully on the world's markets against other exporting nations already in the field. In this connection it is worth recollecting that the general demand for olive oil is such that it will not be so much a question of displacing rival exporters, as a question of our ability to supply good olive oil at the world's average prices and at a profit to ourselves. Locally we have hitherto had the great advantages of a protected market, and of supplies much below actual demands; hence it is natural that local prices should have been high relatively to prices ruling beyond the incidence of our Customs duties. I have been informed that prior to Federation, prices ruled round about 7s. 6d. per gallon; in the 14 years which preceded the war prices rose from 7s. 6d. to 11s.; whilst at the present moment 13s. a gallon is the ruling wholesale rate. I am afraid that on the open markets of the world we cannot anticipate securing anything like these prices; what the latter have been within recent times I have endeavored to determine from the declared values of imports and exports at various centres. These figures have been summarised below in Table V.

TABLE V.—*Showing Average Import and Export Values of Olive Oil in Various Centres Between* 1903-12 *and* 1909-13 *Respectively.*

Country and Period.	Value of oil imported. per gall.	Value of oil exported. per gall.
Portugal (1903-12)	—	4s. 2d.
Spain (1903-12)	—	3s. 4d.
Italy (1903-12	3s. 7d.	4s. 11d.
Greece 1903-11)	—	2s. 1d.
Bulgaria (1903-11)	3s. 3d.	—
Serbia (1903-12)	2s. 5d.	—
Roumania (1902-11)	3s. 4d.	—
Brazil (1902-11)	6s. 8d.	—
Uruguay (1902-11)	5s. 3d.	—
Argentine (1903-12)	3s. 3d.	—
United Kingdom (1909-13)	5s. 2d.	—
United States of America (1909-13)	6s. 6d.	—

We may note from this table that there are great variations in the prices quoted at the various centres. We must not infer from this, however, that these differences are exclusively the result of remoteness from or closeness to centres of supply or consumption. Much in this connection must be allowed for varying quality in the oil sold; a commercial character very largely dependent on manufacturing processes which are notoriously lax in the East. So far as we are concerned we have no reason to fear any lack of quality in the oils which we may place on the market; climate and soil are in our favor, and skill and care in manufacturing processes are not beyond our reach. In this connection it may be pointed out that on the local market we have been able to maintain prices well above those secured for imported oil, even after due allowance has been made for the 2s. 6d. duty. I find that the average c.i.f. values of olive oil imported by the Commonwealth have within recent years been as follows:—1912, 5s. 9d. per gallon; 1913, 6s. 6d.; 1914, 6s. 3d.; 1912-14, 6s. 2d.

Between 1912 and 1914, therefore, after adding 2s. 6d. for duty, olive oil has been imported into the Commonwealth at an average price of 8s. 8d. per gallon. Over the same period, however, the average price of the local article has been considerably above this figure. I mention these facts in support of the contention that whatever they may happen to be, we may always depend upon commanding on the markets of the world top prices for our olive oil.

The prospects of our export trade therefore appear to depend on whether we can, at a profit to ourselves, place in Great Britain or in North America, first-class olive oil at 5s. to 6s. per gallon. Our ability to do this revolves around the average local cost of production; a question which it is never easy to determine satisfactorily; chiefly because in actual practice so much depends on the personal factor. I am con-

pelled, however, to attempt to make some such estimate from local figures that have been very kindly supplied to me.

Pruning, I am informed, need not exceed an average of more than 10s. per acre per annum (allowing for a heavy pruning every third year, followed by two light prunings). Tillage is not likely to exceed that figure, and in the way of working expenses there remains only the cost of picking the fruit to be taken into consideration; and this, unfortunately, is said to vary between £4 and £5 10s. a ton. I am informed by the Stonyfell Olive Company that for their own groves they consider 2.2 tons a fair average yield of olives. I am rather doubtful as to whether this figure can be used with safety in the way of a general average for the State. It approximates, it is true, the average French yield, but on the other hand, it is much in excess of that of Spain and of other southern countries in which average yields do not exceed 10cwts. to the acre.

If, however, we were to assume the average yield per acre to be two tons per annum, the yearly working expenses would be approximately £11 per acre; to this sum would have to be added the rental value of the land, and the yearly contributions towards a sinking fund, representing the cost of establishing the groves and maintaining them during their early unproductive years. It is not easy to determine satisfactorily a general figure of this kind; probably, however, £1 an acre would cover most cases. Hence, for a two-ton crop, general expenses per acre would be represented by £12. The berries, I am informed, are purchased at the rate of £11 a ton delivered; hence, the net profits per acre are likely to vary from £9 to £10, according to the distance from centres.

If, on the other hand, the average yield per acre is only one ton, net profits would vary from £4 to £4 10s. per acre.

We have finally to consider the position of the olive oil maker who purchases his berries. If for the latter he pays £11 per ton, and tracts therefrom about 35½galls. of oil, which I am informed is in accordance with local practice, then, independently of manufacturing expenses, the cost of his raw material alone represents about 6s. 3d. in the value of the oil extracted. This is, I am afraid, a crippling outlay should one have to face selling prices on distant markets of 5s. to 6s. per gallon. The position, however, is not altogether impossible from the point of view of the oil maker who grows his own fruit.

Picking, it will be noted, is the chief economic stumbling block, representing, as it does, nearly half the commercial value of the fruit, and about three-quarters of the yearly working expenses in a one-ton crop, or seventeen-twentieths of the working expenses in a two-ton crop. Very probably, however, if olive-growing were ever to be adopted

here on a large scale, some labor-saving method of collecting the fruit would be devised.

VIII.—CONCLUSION.

In conclusion, I respectfully submit that from the point of view of Commonwealth consumption alone, we can with perfect safety extend our olive groves to an area of fifteen to twenty thousand acres. From the point of view of the export market, however, if we could safely venture thereon, the prospects of extension are almost unlimited. And whilst I admit that the issue in this direction is clearly debatable, I believe, nevertheless, that we shall be in a position ultimately to overcome such difficulties as may arise.

I respectfully submit, too, that from the general point of view the industry is well worth encouraging on the lines indicated in this report. And in this work, when the time comes, returned soldiers whom it may otherwise be difficult to employ, could be profitably employed in building up new groves for the State in the way suggested in this report.

THE COMING HARVEST.

OFFICIAL ESTIMATE, 33,368,702 BUSHELS.

The official estimate of the quantity of wheat that will be harvested in South Australia has been compiled by the Government Statist (Mr. W. L. Johnston), who computes that the yield for the season 1916-17 will be 33,368,702bush. Whilst this falls short of last year's production by 765,802bush., it is nevertheless appreciably higher than the yield of any previous year.

The Central division, it is anticipated, will fall short of last year's production to the extent of 280,913bush., the Lower North 1,191,382bush., and the South-East 558,664bush., but the Upper Northern division is expected to yield 577,992bush. more than was gathered there last year, and the Western area promises to show a surplus over last year's figures to the extent of 687,165bush. The average per acre for the area sown in the State, 12.41bush., closely approximates that of 1915-16, viz., 12.46.

In each of the divisions, the total weight of hay cut promises a decrease on the figures of 1915-16, this decrease amounting to, for the whole State, 277,959 tons.

The Area Sown.

The December estimate of the area sown to wheat gives this figure at 3,086,169 acres. Of this area, it is anticipated that 2,689,159 acres will be reaped for grain, 368,642 acres cut for hay, and 28,368 acres, including areas self-sown, fed off.

Comparison with last year's statistics reveals a falling off in the area reaped to the extent of 50,055 acres, and the area cut for hay 107,781 acres.

Tabulated, the figures of the harvest estimate are as follows:—

STATE OF SOUTH AUSTRALIA.

December Estimate of Production Wheat Harvest, Season 1916-17.
Grain, 33,368,702bush.; average, 12·41bush. Hay, 476,557 tons; average 1·29 tons.

County.	Grain.		Average per Acre.		Hay.	
	Actual, 1915-16.	Estimated, 1916-17.	Actual, 1915-16.	Estmtd., 1916-17.	Actual, 1915-16.	Estmtd., 1916-17.
CENTRAL—	Bush.	Bush.	Bush.	Bush.	Tons.	Tons.
Albert	1,025,613	1,063,743	8·73	8·76	12,237	12,394
Alfred	1,085,864	1,273,979	11·19	10·97	14,323	15,330
Eyre	839,634	877,919	10·00	11·29	24,825	15,087
Fergusson	2,218,760	2,024,159	13·85	13·29	22,718	16,015
Gawler	2,087,550	1,999,448	15·12	14·57	89,224	45,973
Light	1,706,987	1,371,078	16·52	13·48	96,648	51,841
Stort	814,598	830,474	11·06	10·92	18,911	15,514
Other counties	461,045	498,328	13·57	13·80	112,675	58,131
Total	10,220,051	9,939,138	12·78	12·12	391,059	230,285
Increase	—	−280,913	—	−·66	—	−160,774
LOWER NORTH—						
Burra	656,549	524,558	18·98	16·23	10,733	6,566
Daly	3,751,800	3,614,183	13·51	13·45	61,963	35,024
Stanley	4,505,720	3,912,311	18·83	16·09	77,593	42,184
Victoria	3,595,833	3,195,120	16·89	16·08	90,622	49,985
Other counties	187,777	260,125	7·72	10·83	3,313	3,784
Total	12,897,679	11,506,297	15·54	15·01	244,224	137,543
Increase	—	−1,191,382	—	−·53	—	−106,681
UPPER NORTH—						
Dalhousie	1,218,458	1,225,853	12·47	13·17	21,756	16,296
Frome	1,918,553	1,982,500	13·71	13·76	32,712	26,159
Newcastle	127,889	291,065	6·32	12·59	2,194	5,963
Other counties	117,892	459,360	3·19	10·67	1,209	6,207
Total	3,380,792	3,958,784	11·47	13·05	57,871	54,625
Increase	—	577,992	—	1·58	—	−3,246
SOUTH-EASTERN—						
Buccleuch	787,388	760,725	8·98	8·24	4,652	4,555
Buckingham	791,066	471,526	13·46	11·77	3,254	2,187
Chaffey	1,713,055	1,542,873	12·05	11·88	10,422	5,676
Russell	237,659	321,287	8·61	9·92	2,858	3,202
Other counties	521,730	395,838	12·27	11·71	7,188	7,016
Total	4,050,893	3,492,229	11·54	10·63	28,374	23,636
Increase	—	−558,664	—	−·91	—	−4,738
WESTERN, Etc.—						
Dufferin	163,553	225,237	8·89	10·49	1,317	1,108
Flinders	749,763	482,361	10·24	8·93	5,070	3,636
Jervois	1,183,572	1,209,806	8·70	8·94	12,984	9,476
Kintore	140,742	248,430	5·84	8·92	777	1,157
Musgrave	326,238	228,018	10·94	8·18	3,384	1,540
Robinson	576,911	636,976	8·17	9·03	4,468	3,651
Way	435,226	1,056,739	4·48	10·70	2,136	5,727
Other counties, &c.	209,084	384,687	7·66	11·07	2,852	3,873
Total	3,785,089	4,472,254	7·94	9·50	32,988	30,468
Increase	—	687,165	—	1·56	—	−2,520
Grand total	34,134,504	33,368,702	12·46	12·41	754,516	476,557
Increase	—	−765,802	—	−·05	—	−277,959

ROSEWORTHY AGRICULTURAL COLLEGE.

SIXTH REPORT ON THE PERMANENT FIELD EXPERIMENTS, SEASONS 1904-1915.

[By WALTER J. COLEBATCH, B.Sc., M.R.C.V.S., Principal, Roseworthy Agricultural College, and R. C. SCOTT, Assistant Experimentalist.]

(Continued from page 359.)

(C)—ROTATIONAL EXPERIMENTS.

From the scheme of rotational experiments included in the introductory remarks to this report, it will be seen that we have seven different rotations under observation, namely, two 2-course, two 3-course, one 4-course, and two 5-course systems. Of these the 4-course and one of the 5-course series have not been established long enough to admit of a complete cycle of operations on any one plot, and hence we are not in a position to comment upon them. In the bare fallow-wheat-barley rotation and also in the other 5-course experiment the first cycle has been concluded, and in the remainder of the series we are in an even better position in this regard.

In the past, other forms of cropping rotation have been tried, but, for reasons given in prior reports, they have been found wanting, and discontinued. Those that are now under study comprise the systems that, in the light of general farming experience gained in the district and also of experimental knowledge acquired at first hand, appear to be the most likely to prove of importance under local conditions. In view of the upward trend of livestock values, any suggestion that will lead to an increase in the stocking capacity of our farms is deserving of thoughtful consideration, and it is only by submitting various schemes of cropping to the practical test that we can hope to place ourselves in a position to judge of their relative economic values. Rotational experiments must obviously be protracted over a long succession of seasons before deductions from the data supplied can be expected to carry full weight, as the effects of one crop upon another will only be exerted once during each cycle of operations, and hence a series of cycles are required to bring out results that may be regarded as indicative of the economic worth of any rotation established on a permanent basis.

1.—TWO-COURSE ROTATIONS.

(*a*) Bare Fallow-Wheat.

This simple system exemplifies the usual method of farming adopted in the wheatgrowing areas of the State. The College tests have been in progress continuously on the same pair of plots since 1905; so that we now have the results of more than five cycles available.

In the table below are given the detailed results for this period, together with the means:—

Table XL.—*Showing Harvest Returns from Wheat Grown Continuously after Bare Fallow, with* 1*cwt. Superphosphate to the Acre* (*Plots* 10 *and* 11), 1905-15.

Year.	Total Produce per Acre. T.	C.	L.	Grain per Acre. Bush.	lbs.	Straw to 60lbs. of Grain. lbs.	Bushel Weight. lbs.
1905	2	11	54	28	56	139	62½
1906	2	8	100	23	43	171	58½
1907	1	8	88	20	31	97	62¼
1908	2	11	26	32	46	115	64½
1909	2	7	61	29	54	118	62½
1910	2	5	98	19	49	199	64¼
1911	1	8	9	14	7	163	63¼
1912	1	6	32	18	11	102	65¾
1913	0	10	19	5	4	165	60
1914	0	8	106	6	9	163	64½
1915	2	9	9	23	32	234	60½
Means	1	16	4	20	15	151	62½
Mean—Hay equivalent	2	3	106				

We see that under this rotation the mean wheat yield is 20bush. 15lbs., and the corresponding hay yield 2 tons 3cwts. 106lbs. per acre under crop. At normal values, these yields represent gross cash returns of £3 10s. 10d. and £3 16s. 11d., and since they have been obtained with the use of but 1cwt. of superphosphate per acre, a deduction of 4s. 6d. only per acre will give the net values. In order to arrive at what may be termed the true net profits from these mean yields, we shall require to allow for rent, tillage, harvesting and marketing of the produce. It is customary to reckon the rental value of wheatgrowing land in this district at 10s. per acre, and for the purposes of this report, we have estimated the cost of growing and disposing of the crop at 30s. per acre. On these values, the net profit per acre will be the gross cash returns less the rental value of two acres and cost of production. This works out at a net profit of £1 0s. 10d. per acre under crop, or 10s. 5d. per acre over the whole area when the crop is harvested for grain, and £1 6s. 11d. per acre of crop, or 13s. 5d. per acre over all when it is cut for hay. It is evident, therefore, that in this district hay-growing is a better paying

venture than grain production, and that to the extent of approximately 6s. per acre under crop. In submitting these monetary computations, however, we recognise that the values chosen are pure estimates, and will be subject to modification, according to circumstances and personal experience. They are, however, approximately true for this district, and we regard them as sufficiently accurate to enable reliable comparisons to be made. In addition to the profit derived from the crop, we have to credit this rotation with the cash value of the sheep-grazing obtained on the fallow, on the stubble, and that provided between March and ploughing time. The fallow grazing cannot be fairly gauged on small-sized plots, but past experience on the farm areas has led to this being appraised at 0.25 sheep per acre per annum in average seasons. The stubble and autumn grazing returns are given below:—

TABLE XLI.—*Showing the Grazing Capacity of Land Treated Alternately as Wheat and Bare Fallow* (*Plots* 10 *and* 11), 1907-15.

Year.	Stubble Grazing.		Winter Grazing before Fallowing.	
	Equivalent Sheep per Acre per Annum.	Gross Returns at 15s. per Sheep per Annum. s. d.	Equivalent Sheep per Acre per Annum.	Gross Returns at 15s. per Sheep per Annum. s. d.
1907	—	—	0·93	13 11½
1908	—	—	0·46	6 11
1909	0·42	6 4	0·15	2 3
1910	0·25	3 9	0·54	8 1
1911	0·36	5 5	0·49	7 4
1912	0·67	10 1	0·00	—
1913	0·21	3 2	0·00	—
1914	0·34	5 1	0·12	1 10
1915	0·78	11 8	0·54	8 1
Means	0·43	6 6	0·36	5 5

The total value of the grazing is thus seen to be 6s. 6d. plus 5s. 5d plus 3s. 9d., or 15s. 8d. per annum, which is equivalent to 7s. 10d. per acre per annum over the whole area.

Combining the crop and grazing returns, the total net profit per acre per annum over the whole area under this rotation comes to be 18s. 3d. when grain is harvested, and 21s. 3d. when hay-growing is practised. It is doubtful if the same net profits could be obtained from large areas as are quoted above, for it would not be possible to turn to account the sheep fed over broad acres as thoroughly as is done in the case of small plots on which sheep are drafted in the required numbers and at the most suitable times from the farm flock. Moreover, it is not reasonable to expect that averages gained over small blocks could be attained on fields fifty or a hundred times as

large. Indeed, on our own farm the mean yields fall somewhat below those recorded in the foregoing tables. Nevertheless, the results quoted have actually been obtained, and hence may be regarded as a proper measure of the producing value of the rotation when conducted under ideal conditions. Since all the other plots with which we shall have to compare these returns have received equivalent treatment and are of approximately the same area, no valid objection can be taken to inferences drawn from the data supplied by them.

(*b*) Sorghum-Wheat.

It has been the practice at Roseworthy College for many years to grow, or, perhaps it would be more correct to say, attempt to grow, crops of sorghum without irrigation, and in the history of the institution many excellent fields of summer forage have been raised. After a few seasons, however, it became evident that sorghum was not to be classed as a reliable crop, and latterly we have come to regard it as too risky to be hazarded in large areas. Notwithstanding this, however, we continue to sow a few acres each spring, with a view to providing additional grazing for sheep and dairy cattle through the late summer months. There can be no gainsaying the fact that a crop of well-grown sorghum is invaluable on a mixed farm in this district from December to March. Owing to the toxic character of its foliage under dry conditions, when growth has been arrested and crude products such as hydrocyanic acid have accumulated in the sap, serious consequences have resulted from allowing stock—particularly dairy cows—to consume it in the field or immediately after being cut. Errors of this kind, however, are easily overcome by proper management, and it is a fine tribute to the value of the crop in the eyes of farmers that it continues to be grown as a stock food in spite of the criticism that has been levelled at it by those who have had the misfortune to suffer loss through using it.

Whatever may be the opinions held by others, we have no hesitation in saying that, when properly managed, sorghum may be fed with absolute safety to all classes of farm stock, and if we were located in a moister climate much larger blocks would be sown in the College fields.

As it is, however, we have to consider the effects of a summer forage crop of this nature on the main crops grown and through them on the system of farming generally practised. We shall see in a moment that there is a good deal to be said against as well as in favor of the substitution of a sorghum crop for bare fallow, but there are other factors to be considered in the case, that cannot be expressed in

terms of figures. However, before going into this aspect of the question, let us examine the results obtained from the test plots.

TABLE XLII.—*Showing the Yields of Wheat after Sorghum, Comparatively with Yields of Wheat after Bare Fallow,* 1906-15.

Year.	Total Produce per Acre.						Grain per Acre.				Bushel Weight.	
	Wheat after Sorghum.			Wheat after Bare Fallow.			Wheat after Sorghum.		Wheat after Bare Fallow.		Wheat after Sorghum.	Wheat after Bare Fallow.
	T.	C.	L.	T.	C.	L.	Bush.	lbs.	Bush.	lbs.	lbs.	lbs.
1906	2	0	39	2	8	100	18	3	23	43	57	58½
1907	0	17	22	1	8	88	13	7	20	31	61½	62½
1908	2	9	96	2	11	26	28	16	32	46	63½	64½
1909	2	1	49	2	7	61	20	44	29	54	62½	62½
1910	2	0	44	2	5	98	18	25	19	49	63½	64½
1911	1	3	8	1	8	9	12	38	14	7	64½	63½
1912	1	10	33	1	6	32	20	18	18	11	64	63½
1913	0	8	39	0	10	19	3	19	5	4	61½	60
1914	0	0	0	0	8	106	0	0	6	9	—	64½
1915	2	0	93	2	9	9	20	35	23	32	63	60½
Means	1	9	20	1	11	55	15	32	19	23	62½	62½
Mean— Hay equivalent	1	15	68	2	2	7						

These yields clearly teach us the lesson that any withdrawal of moisture from fallows per medium of forage crops will reveal its effects in the following season on the cereal crop. The mean figures for 10 years show a reduction in the grain yield of 4bush. all but 9lbs. and in the hay yield of nearly 6¼cwts. per acre, as a consequence of growing a summer forage crop. The grazing on the stubbles and just previous to fallowing is practically equivalent to that obtained under the bare fallow-wheat rotation, but the forage crop raises the total grazing figures by approximately 33 per cent. Details of the grazing are tabulated below:—

TABLE XLIII.—*Showing Annual and Mean Grazing Returns from Sorghum–Wheat Rotation,* 1908-15.

Year.	Stubble Grazing—Sheep per Acre.	Autumn Grazing—Sheep per Acre.	Sorghum Grazing—Sheep per Acre.	Mean Total Grazing—Sheep per Acre
1908	0·33	0·07	0·75	—
1909	0·29	0·43	1·12	—
1910	0·36	0·53	0·94	—
1911	0·67	0·00	0·00	—
1912	0·72	0·00	0·73	—
1913	0·50	0·00	0·51	—
1914	0·34	0·69	0·00	—
1915	0·89	0·28	0·64	—
Means	0·51	0·23	0·59	1·35

It will be noticed that in 1911 and 1914, the sorghum crop failed entirely, whereas in 1909 it provided feed equivalent to a capacity 1.12 sheep per acre per annum. The value of the mean grazing over the whole area will be seen to work out at 1.35 sheep per acre per annum, which, on our estimate of the average value of a sheep, works out at £1 0s. 3d.

We will next proceed to compare this rotation with the ordinary bare fallow-wheat system of cropping.

TABLE XLIV.—*Comparing Gross and Net Returns from Wheat and Wheaten Hay Crops Grown under Bare Fallow—Wheat and Sorghum—Wheat Rotations*, 1908-15.

	BARE FALLOW—WHEAT.				SORGHUM—WHEAT			
	Grain.		Hay.		Grain.		Hay.	
	£ s. d.		£ s. d.		£ s. d.		£ s. d.	
Receipts—								
Crop	3 5 5		3 11 3		2 14 4		3 2 6	
Grazing	0 15 8		0 15 8		1 0 3		1 0 3	
Total receipts per acre for two years	4 1 1		4 6 11		3 14 7		4 2 9	
Total receipts per acre per annum	2 0	6½	2 3	5½	1 17	3½	2 1	4½
Expenditure—								
Rent at 10s. per acre	1 0 0		1 0 0		1 0 0		1 0 0	
Cost of production	1 10 0		1 10 0		1 18 0		1 18 0	
Total expenditure per acre for two years	2 10 0		2 10 0		2 18 0		2 18 0	
Total expenditure per acre per annum	1 5 0		1 5 0		1 9 0		1 9 0	
Balance of receipts over expenditure per acre per annum	0 15	6½	0 18	5½	0 8	3½	0 12	4½

It requires to be explained that the above calculations have been made on the mean results secured over an eight-year period. With reference to the cost of production, it may be added that an additional 8s. per acre has been allowed for in the summer crop rotation, to meet the cost of ½cwt. of bonedust and 7lbs. of seed. Both in hay and grain cropping, the bare fallow shows to better advantage than the forage crop, the difference being in the vicinity of 6s. or 7s. per acre, and, therefore, it would appear that in order to grow sorghum in this district we must be prepared to sacrifice about 8cwts. of hay or 4bush. of grain for every acre grown in alternation with wheat. On the face of it, one would say that the cost was too great, and that consequently sorghum must in future be treated as an irrigation crop only; but it would be unwise to jump to conclusions too quickly in this matter, for there are other aspects of the question to be taken into consideration. For instance, in bad years, when the paddocks

run out early in October, and there are no prospects of obtaining sheep-keep between then and the following April, excepting the dry feed on the cereal stubbles, the value of a block of green forage such as sorghum is vastly greater than 7s. 6d. per sheep for six months, which is all we have credited it with in the above calculations. To put it in another way, the worth of succulent grazing during the dry months is in reality much higher than it is in the growing period of the year, and strictly speaking, should be conceded a higher grazing value than the 15s. per sheep, which we have taken as the basis of our computations. In extreme cases a crop of sorghum may be the means of enabling a farmer to carry through his stock instead of having to disperse them at a sacrifice and repurchase in a rising market. We are willing to admit that if grown in large areas in a sorghum-wheat rotation in preference to the bare fallow-wheat system, the receipts of the farm would be appreciably reduced thereby, but we still incline to the view that this fact does not prejudice the opinion that it is wise and commendable for farmers under our climate to reserve limited areas for sorghum each year, and if by so doing they can provide grazing equivalent to what has been obtained at the College from time to time, they will appreciate the tenacity with which we cling to sorghum, as being the most satisfactory of all summer forage crops in this district, under a dry-farming system.

2.—THREE-COURSE ROTATIONS.

(*a*) Bare Fallow-Wheat-Pasture (Rape).

In its simplest form—bare fallow-wheat-grass—this forms the most widely spread three-course rotation in the State. It is a natural corollary to the bare fallow-wheat system, and in many districts is stoutly championed as being superior in every way to the ordinary two-course system. In the first instance a year of grass was interpolated to give the land a rest, but more recently the profit-earning claims of sheep have induced farmers to substitute a forage crop for the natural grass, and thus to give the land an opportunity of furnishing a growth of fattening fodder for lambs during the resting period.

When the College plots under this rotation were first started in Field No. 4 the resting plot was allowed to lie untouched, but latterly rape crops have been grown instead.

The plot sown to wheat has invariably received 1cwt. of superphosphate per acre, so that this series is strictly comparable with the bare fallow-wheat rotation.

The cropping results from 1908/1915 are contained in the following table:—

TABLE XLV.—*Showing Harvest Returns from Land coming under Wheat Once in Three Years and Dressed Regularly with* 1cwt. *of Superphosphate*, 1908-15.

Year.	Total Produce per Acre. T.	C.	L.	Grain per Acre. Bush.	lbs.	Straw to 60lbs. of Grain. Lbs.	Bushel Weight. Lbs
1908	2	11	55	29	1	139	63¾
1909	2	10	56	26	37	152	62½
1910	2	10	71	19	2	238	63½
1911	1	17	69	17	51	176	61¼
1912	1	11	93	20	54	111	65
1913	0	11	48	6	8	149	60½
1914	0	11	37	8	20	152	65
1915	2	3	18	23	3	210	62¾
Means	1	16	0	18	52	166	63
Mean—Hay equivalent	2	3	101	—		—	—

At first glance it would appear that wheat crops raised on the bare fallow-wheat system yield higher returns of grain than those on the three-course, but this is not really so, for if we compare the two mean figures for the same period, namely, 1908/1915, we shall find that there is a difference of only 11lbs. per acre, and that is in favor of the longer rotation. In hay yield, if we disregard the figures for 1905-1907 inclusive, the three-course system is seen to produce on the average 3cwts. 19lbs. more, and at 35s. per ton, this is worth 5s. 7d. per acre. The total values of the mean yields calculated at the usual rates, work out at £3 6s. and £3 16s. 10d. per acre, under grain and hay respectively, so that here again we are confronted with convincing evidence that at Roseworthy hay crops are better worth the growing than grain crops.

In a three-course rotation, which includes a forage crop, the revenue from grazing is a very important consideration, particularly in good grass seasons like 1915. The succeeding table will illustrate the fact that the grazing returns vary within very wide limits according to the seasons—

TABLE XLVI.—*Showing Grazing Value of Land Available for Stocking in Bare Fallow—Wheat—Pasture Rotation*, 1908-15.

Year	Stubble Grazing—Sheep per Acre.	Autumn Grazing—Sheep per Acre.	Forage Crop Grazing—Sheep per Acre.	Fellow Grazing—Sheep per Acre.
1908	0·84	0·19	2·54	—
1909	0·21	0·51	1·99	—
1910	0·14	1·02	1·20	—
1911	0·66	0·57	1·11	—
1912	0·76	0·00	1·68	—
1913	0·23	0·00	0·60	—
1914	0·38	0·25	0·53	—
1915	2·29	0·90	4·64	—
Means	0·69	0·45	1·79	0·25
Values at 15s. per sheep per annum	10s. 4d.	6s. 9d.	26s. 10d.	3s. 9d.

It will be recalled that the value of the grazing per acre per annum, under the bare fallow-wheat system was 7s. 10d., whilst it is now seen that the introduction of a forage crop year has raised the income from grazing up to 16s. 4d., or more than the equivalent in value to a sheep per acre over the whole area.

The total value of the grazing per annum per acre of land grazed amounts to no less than £2 7s. 8d., and towards this amount the forage crop has contributed 26s. 10d., the stubble grazing 10s. 4d., autumn grazing 6s. 9d., and the fallows 3s. 9d.

Being now in possession of the required particulars, we are able to draw up a statement of receipts and expenditure for the bare fallow-wheat and bare fallow-wheat-pasture rotations, and to compare the annual returns in terms of money values.

TABLE XLVII.—*Comparing Gross and Net Returns from Wheaten Hay Crops Grown under the Bare Fallow—Wheat and Bare Fallow—Wheat Pasture Rotations*, 1908/15.

	TWO-COURSE ROTATION.				THREE-COURSE ROTATION.			
	Crop Cut for Grain.		Crop Cut for Hay.		Crop Cut for Grain.		Crop Cut for Hay.	
Receipts—	£ s. d.		£ s. d.		£ s. d.		£ s. d.	
Crop	3 5 5		3 11 3		3 6 0		3 16 10	
Grazing	0 15 8		0 15 8		2 7 8		2 7 8	
Total receipts per acre for two years	4 1 1		4 6 11		5 13 8		6 4 6	
Total receipts per acre per annum	2 0 6		2 3 5		1 17 11		2 1 6	
Expenditure—								
Rent at 10s. per acre	1 0 0		1 0 0		1 10 0		1 10 0	
Cost of production	1 10 0		1 10 0		1 15 0		1 15 0	
Total expenditure per acre for two years	2 10 0		2 10 0		3 5 0		3 5 0	
Total expenditure per acre per annum	1 5 0		1 5 0		1 12 6		1 12 6	
Balance of receipts over expenditure per acre per annum	15s. 6d.		18s. 5d.		16s. 3d.		19s. 10d.	

Some explanatory notes may be necessary to a clear understanding of these figures. In calculating the revenue from crop and grazing, the mean results of the eight years ending 1915 have been used. In order to arrive at the total receipts or expenditure per annum, the total receipts or expenditure per cycle of operations must be divided

by the number of years represented in the rotation, that is, by two in the one case, and by three in the other.

With regard to the cost of production, an additional 5s. per acre has been charged against the three-course rotation to defray cost of rape seed and seeding.

The final figures of this table go to show that no matter whether the crop be cut for hay or left for grain, the three-course rotation is a more profitable system of farming than the alternation of bare fallow and wheat. In the case of wheat crops cut for grain, the difference is 9d. per acre per annum, and when cut for hay slightly under 1s. 5d.

These experiments, therefore, appear to have demonstrated quite clearly that the interpolation of a forage crop in the ubiquitous two-course rotation does not spell disaster, but on the contrary, is attended with enhanced monetary returns.

(*b*) Bare Fallow-Wheat-Barley.

The astonishing success which attended the introduction of barley into the farm cropping at the College stimulated interest in the possibilities of this crop as a means of diversifying the system of farming without detriment to the wheat crop. It is accepted as an axiom that wheat cannot be grown continuously on the same land year after year successfully, and even if it were not generally acknowledged, we have had ample experimental evidence of the truth of it in our Permanent Experimental Field. It is only recently, however, that it has come to be recognised that barley may be grown profitably on a wheat stubble, in fact, we have averaged over the past 12 years, 30bush. 45lbs. per acre from barley crops thus placed.

We are referring to the so-called "Cape" barleys, and not to two-rowed varieties, known as malting barleys, so that in estimating the value of the above yield, we have allowed only 2s. 6d. per bushel, which gives a total of £3 17s. 3d. per acre gross return. We are bound to admit, therefore, that the barley crop has proved to be at least as profitable as the average wheat crop, and if we take into account the reduced expenditure incurred in preparatory work and seeding operations, the difference in favor of the barley crop will be increased. From a knowledge of these facts arose the desire to test barley under more accurate conditions of working, and it was therefore decided in 1911 to initiate a rotation of bare fallow-wheat-barley on a permanent basis. In this scheme, both wheat and barley receive 2cwts. per acre of superphosphate at seeding, and the crops are cut with the binder and put

through an English thresher. The results to hand up to the present are as under:—

TABLE XLVIII.—*Showing Crop Returns from Bare Fallow—Wheat—Barley Rotation*, 1911-15.

Year.	WHEAT. Grain per Acre. Bush. lbs.	WHEAT. Total Produce per Acre. T. c. l.	BARLEY. Grain per Acre. Bush. lbs.
1911	24 12	1 19 3	43 9
1912	22 39	1 14 99	19 14
1913	7 12	0 11 43	9 18
1914	8 10	0 13 46	0 45
1915	26 20	2 5 18	38 21
Means	17 43	1 8 87	22 11
Mean—Hay equivalent	—	1 15 10	—

In the first place it is clear that so far there is no indication that the wheat yield has suffered any diminution through the inclusion of a second white straw crop. Thus, under the bare fallow-wheat-pasture system the mean wheat yield under a 2ewt. dressing of superphosphate for the period of 1911/1915 is 17bush. 6lbs., as compared with 17bush. 43lbs. in the rotation now under review. The corresponding hay yields are 1 ton 15cwts. 103lbs., and 1 ton 15cwts. 10lbs. per acre. The mean yield of barley is much below the farm average, but this is easily understood on looking into the nature of the seasons experienced since this rotation was started. Only five years' results are available, and in the case of two seasons the whole of the cereal yield were depressed through drought, whilst in 1912 the weather generally was less favorable to barley than wheat.

It is a matter for regret that we are not in a position to give grazing returns for this rotation. Being but one amongst many pressing operations demanding attention, the erection of divisional fences has had to wait its turn, and consequently actual records of the sheep-carrying capacity of the three plots concerned are not available. Nevertheless, we can arrive at the probable minimum value over the five-year period by applying the results obtained on other plots similarly circumstanced. For example, the wheat stubble grazing in this rotation will be approximately equal to that recorded in the 2cwts. superphosphate series of the bare-fallow-wheat-pasture rotation. In this instance, however, there will be no autumn feeding between the wheat and barley crops, as the land will be lifted early in preparation for the latter. The barley stubble is almost invariably better stocking than wheat stubble, but for our present purposes we will assume it to be equivalent. The autumn grazing after the barley stubble will also

be better on the average than after a wheat stubble, so here again we will be safe in allowing an equal number of sheep per acre per annum. The fallow grazing will, as usual, be estimated at a quarter of a sheep per acre. By adopting these conservative estimates for grazing we are enabled to draw up a balance between the undermentioned rotations:—

TABLE XLIX.—*Comparing Gross and Net Returns from Bare Fallow—Wheat—Barley Rotation with those from the Bare Fallow—Wheat—Pasture Plots. The Dressing of Manure used, 2cwts. Superphosphate per acre on Cereal Crops*, 1911-15.

	BARE FALLOW—WHEAT—PASTURE.		BARE FALLOW—WHEAT—BARLEY.	
	Grain.	Hay.	Grain.	Hay.
Receipts—	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Crops	2 19 10	3 2 10	3 2 0	3 1 5
			2 15 7	2 15 7
Grazing	2 12 4	2 12 4	1 18 7	1 18 7
Total receipts per acre for three years	5 12 2	5 15 2	7 16 2	7 15 7
Total receipts per acre per annum	1 17 5	1 18 5	2 12 1	2 11 10
Expenditure—				
Rent at 10s. per acre	1 10 0	1 10 0	1 10 0	1 10 0
Cost of production	1 15 0	1 15 0	3 0 0	3 0 0
Total expenditure per acre for three years	3 5 0	3 5 0	4 10 0	4 10 0
Total expenditure per acre per annum	1 1 8	1 1 8	1 10 0	1 10 0
Balance of receipts over expenditure per acre per annum	0 15 9	0 16 9	1 2 1	1 1 10

It should be noted under the bare fallow-wheat-barley rotation that the values of the wheat and barley crops are given separately, and in that order. The barley yield in the hay schedule is, of course, the value of the grain crop, since it is not the practice to make barley hay in this district.

The £3 charged under the item "Cost of production" is made up as follows:—Cost of producing wheat crop, £1 10s.; cost of producing barley crop, £1 1s.; cost of extra cwt. of manure for each of the above, 9s.; total, £3.

On looking at the final figures, which constitute a measure of the annual net returns per acre, the rotation including two cereal crops will be seen to present more attractive results than the one providing a year of forage. It is too soon to say that the balance-sheet is in any sense conclusive, but it is certainly interesting to find that even over a period during which weather conditions have been more than usually unfavorable to barley crops, the rotation under discussion is apparently the most profitable rotation yet introduced into this district.

4.—FOUR-COURSE ROTATION.

Originally there were two 4-course rotations in the experimental field, one suited for light land and one for heavy soil conditions. After a few years' experience it was found that neither of these were very suitable to the Roseworthy district, hence they were finally reported upon, and four of the plots were regrouped to make room for another 4-course system, comprising kale, barley, pease, and wheat. The kale is sown at the rate of 1½lbs. per acre, and receives 10 tons farmyard manure at ploughing and ½cwt. bonedust at seeding. The wheat, barley, and peas are dressed with 1cwt. of superphosphate per acre, and the two former receive in addition ½cwt. of nitrate of soda. We are not yet in a position to submit and comment on the results of this rotation.

5.—FIVE-COURSE ROTATION.

(*a*) Bare Fallow-Wheat-Pease-Wheat-Barley.

This rotation will serve to show whether it is possible to farm Roseworthy land profitably without resorting to a bare fallow oftener than once in five years, and without giving up the land to temporary pasture of more than one year's duration. Pease constitute our most successful winter-sown grazing crop, and, as already demonstrated, the sowing of barley on the wheat stubble is justifiable on economic grounds. We therefore consider that the above scheme is as likely to succeed as any five-course system comprising four annual crops and one bare fallow. The rotation was inaugurated in 1911, and hence we are now able to record the mean results of the first complete cycle of operations. We may mention that the cereal crops all receive 2cwts. and the pea crop 1cwt. of superphosphate per acre.

Table L.—*Showing Crop and Grazing Returns from Bare Fallow—Wheat, Pease—Wheat - Barley Rotation*, 1911-15.

Year.	GRAIN.						TOTAL PRODUCE.						GRAZING.
	Wheat.		Wheat.		Barley.		Wheat.			Wheat.			Pease. Sheep per Acre. per Ann.
	Bush.	lbs.	Bush.	lbs.	Bush.	lbs.	T.	C.	L.	T.	C.	L.	
1911	15	17	—		—		1	14	21	—			2·18
1912	27	58	13	20	20	26	2	2	99	1	2	93	1·39
1913	6	48	4	6	8	5	0	13	108	0	11	70	1·04
1914	13	20	2	33	0	0	0	17	12	0	4	26	0·36
1915	22	12	23	1	38	4	2	2	31	2	5	34	1 84
Means	17	7	10	45	16	34	1	10	9	1	1	0	1·36
Mean—Hay equivalent	—		—		—		1	10	0	—			—

The records of this rotation bid fair to be of unusual interest, as they tend to shed light on several important matters relating to cereal cropping. We may note in the first place that the average wheat yield

after bare fallow in this system is 17bush. 7lbs., in the bare fallow-wheat-pasture group 17bush. 6lbs., and in the bare fallow-wheat rotation 15bush. 53lbs. There is, therefore, no evidence of depression in the yield of this component of the five-course rotation. When we pass on to consider the wheat crop that follows pease, however, we observe a totally different state of affairs. The mean yield in this instance has fallen to 10bush. 45lbs., which means a reduction of from 5bush. to 7bush. per acre. Combining the two wheat crops, we obtain an average production of 13bush. 56lbs., thus diminishing the difference by rather more than 3bush. per acre. Of course the influence of droughty conditions on the period 1911/1915 has probably been greater than would be the case normally, still it begins to appear likely that we shall have to resign ourselves to a certain shrinkage in the wheat harvest on this series of plots. Exactly the same conclusion will be reached if we examine the hay yields in a similar manner.

The mean figures for the production of barley are much too low to be regarded as typical of the yields that may be confidently expected under more normal weather conditions. This crop, more than likely, will be found to average from 25bush. to 30bush. at least, and it is problematical if it will ever have to be turned over to livestock again as happened in 1914.

This group of plots is located beyond reach of the water supply, and hitherto we have not been able to arrange for the collection of complete data in regard to the grazing value of stubbles and fallows. This defect we hope to overcome in the future, but meanwhile it will be instructive to allot values on the basis of observed results gathered from other plots, and to use the figures so obtained for the purpose of comparing this rotation with others. The grazing of the second wheat stubble will be of less value than that of the first crop, but on the other hand the barley stubble will carry more sheep than the first wheat stubble. If we accept these as compensating differences, and value the grazing of all the cereal stubbles at the same rate, we shall not be doing this rotation more than justice. For a money value of this grazing we will go back to the figures given for stubble feed in the 2cwt. of superphosphate series of the bare fallow-wheat-pasture rotation and adjust the calculations to suit the five-year period 1911/1915. By so doing, we find that the stubbles carried 0.91 sheep per acre per annum, and therefore the total grazing value of the three cereal stubbles amounts to the value of 2.73 sheep per acre. With respect to autumn grazing, there may be some available before the land is ploughed for pease, but our practice is to drill the pease in early, and hence we have included under autumn grazing only that which is available immediately before fallowing. On average figures this would be

represented by 0.50 sheep per acre. The fallow grazing is counted equal to 0.25 sheep per acre, and the forage crop grazing has been shown above to be 1.36 sheep per acre. The total grazing, therefore, over the whole rotation will be fairly represented as the equivalent of 4.84 sheep per acre, which has a cash value of £3 12s. 7d. This means that a farm worked under this rotation would be able to return 14s. 6d. per acre over the entire area from sheep valued at 15s. per head, that is, very nearly a sheep to the acre.

TABLE LI.—*Showing Balance-Sheet of Receipts over Expenditure for Bare Fallow—Wheat, Pease—Wheat, Barley Rotation*, 1911-15.

RECEIPTS.	GRAIN CROP. £ s. d.	HAY CROP £ s. d.
First wheat crop	2 19 11	3 4 2
Second wheat crop	1 17 7½	2 4 10
Barley crop	2 1 8	2 1 8
Grazing	3 12 7	3 12 7
Total receipts per acre for five years	10 11 9½	11 3 3
Total receipts per acre per annum	2 2 4	2 4 8
EXPENDITURE.	£ s. d.	£ s. d.
Rent at 10s. per acre	2 10 0	2 10 0
Cost of production—		
First wheat crop	1 14 6	1 14 6
Second wheat crop	1 4 6	1 4 6
Barley crop	1 5 6	1 5 6
Pea crop	1 5 6	1 5 6
Total expenditure per acre for five years	8 0 0	8 0 0
Total expenditure per acre per annum	1 12 0	1 12 0
Balance of receipts over expenditure per acre-per annum	0 10 4	0 12 8

(*b*) BARE FALLOW-WHEAT-LUCERNE (THREE YEARS).

This is the second of the five-course rotations, and is entirely different in type. It consists of a single wheat crop preceded by bare fallow, and followed by three years of lucerne pasturage. It is a rotation that can only be expected to compare favorably with others where stock and their products are saleable at highly remunerative rates. It appears, therefore, that the establishment of this scheme has taken place under distinctly propitious circumstances, and, given a few favorable seasons in which to establish the lucerne, the profits may even out-rival those from the bare fallow-wheat-barley course. The lucerne seed is broadcasted over the wheat immediately after seeding and lightly covered. It would be distinctly to the advantage of the lucerne if the wheat could be harvested as hay, but as this plan would deprive us of grain records, it is not feasible to adopt it. The results will probably be somewhat irregular as regards grazing, for in dry summer it is not possible to establish a lucerne sward without irrigation, and

the plot sown to lucerne in a droughty year must feel the effects for the remainder of the cycle. To a certain extent the failure, partial or entire, of the lucerne crop will be counter-balanced by spontaneous growth, but the difference in feeding values between lucerne and natural herbage will be clearly reflected in the grazing returns. Only two years' results are to hand so far, and we therefore submit them without comment.

TABLE LII.—*Showing Cropping Returns from Bare Fallow, Wheat, Lucerne (Three Years) Rotation*, 1914-15.

Year.	Grain Yield.	Total Produce Yield.
	Bush. lbs.	T. C. L.
1914	5 26	0 9 90
1915	17 10	2 11 73

SUMMARY OF ROTATIONAL EXPERIMENTS.

In order that the comparative values of the different rotations, in so far as it is possible to express them in cash terms at the present juncture, may be conveniently studied, the subjoined table has been prepared. In the calculations for the older rotations only the results for the period 1908/1915 have been taken into account, and in the case of the more recently established plots the money values have reference only to the years 1911/1915 inclusive:—

ROTATIONS.—SUMMARY.

TABLE LIII.—*Summarising the Total Annual Monetary Returns Per Acre from Land Worked Under Various Systems of Crop Rotation.*

Rotation.	Period.	ANNUAL NET RETURN PER ACRE OVER WHOLE AREA. Wheat Crop Harvested for Grain.	Wheat Crop Harvested for Hay.
		£ s. d.	£ s. d.
Bare fallow, wheat (1cwt. superphosphate)	1908–1915	0 15 6	0 18 5
Sorghum, wheat (1cwt. superphosphate)	"	0 8 3	0 12 4
Bare fallow, wheat, pasture (½cwt. superphosphate)	"	0 14 0	0 17 3
Bare fallow, wheat, pasture (1cwt. superphosphate)	"	0 16 3	0 19 10
Bare fallow, wheat, pasture (2cwts. superphosphate)	"	0 18 1	1 1 0
Bare fallow, wheat, pasture (3cwts. superphosphate)	"	0 16 9	0 19 2
Bare fallow, wheat, barley (2cwts. superphosphate)	1911–1915	1 2 1	1 1 10
Bare fallow, wheat, pease, wheat, barley (2cwts. superphosphate)	"	0 10 4	0 12 8
Bare fallow, wheat, pasture (2cwts. superphosphate)	"	0 15 9	0 16 9

THE POULTRY INDUSTRY.

MARKET PROSPECTS AFTER THE WAR.

[By D. F. Laurie, Government Poultry Expert.]

During recent years there has been most satisfactory growth in the poultry industry. Not only have thousands of recruits joined the ranks of poultry breeders, but there is ample evidence of the general adoption of modern methods of breeding, rearing, feeding and housing poultry in all parts of the State. Not only have the suburban breeders adopted these methods, but still more satisfactory is the condition in which poultry are kept upon numerous farms. This big growth of an already big industry foreshadows the need for speedy organisation of markets in the interests of primary producers. The repatriation of soldiers and consequent land settlement in small holdings will bring about, in the course of a few years, a still more marked increase in production, and the need for exploiting oversea markets will be more urgent.

The basis of any commercial undertaking is the question of markets and competition. We have constantly been told that there is ample outlet in Australia for all the eggs now produced. That may be so at a price, but is that price invariably satisfactory to the producer? The answer, based on the expressed opinions of the breeders of the State, is decidedly no! The business man whose position enables him to express an unbiased opinion on these matters, calls attention to the well-known law of supply and demand. This law is not of local import only—its application is world-wide. Therefore, in common with producers as a body, the egg producers of the State are within their rights in seeking the most profitable outlets. At a push the Australian markets can absorb all our surplus; but without the steadying influence of outside markets the bulk of glut production will pass from the producer to the speculator. We are told that the future prosperity of the State depends on increased primary productions, and it might be added by the adoption of the most modern methods thereto. Without further emphasising the producers' viewpoint, it will further matters by inquiring into the chief oversea market for eggs—that is, in England. Optimists augur that one of the effects of the war will be the welding of the component parts of the Empire into a closer bond. If this is so, it is to be hoped that in the future preference will be accorded to Australian products.

England's Requirements.

The earliest figures obtainable and relating to England's imports of eggs and poultry are for the year 1852, when the sum of £252,000 was sent away. Since that time there has been an increase yearly in the number of eggs and poultry required, until the year 1913 the value was over 10½ millions sterling. Between the years 1892 and 1912 the number of eggs imported per head of the population had risen from 35 to 50 eggs; and the price per dozen had also increased from 7d. to 10.6d.

Average price paid for all eggs imported into England:—1905, 8.7d. per dozen; 1906, 9d.; 1907, 9.2d.; 1908, 9½d.; 1909, 9.8d.; 1910, 9½d.;

1911, 10d.; 1912, 10.6d.; 1913, 10.6d. War was declared in August, 1914; and consequently the whole egg trade was dislocated. I do not, therefore, propose to use the figures, such as they are, for either 1914 or 1915—and those for 1916 are, of course, not yet available. America, during the war, has supplied England with enormous quantities of eggs at high prices. Prior to the outbreak of war, however, both the United States and Canada had ceased exporting eggs to Europe. As a matter of fact, early in 1914 America had established purchasing agencies in Ireland and North France in order to supply her own markets.

South Australia's Position.

Let us now look at our own market records, which are based upon the bi-weekly market quotations published in the daily press by various commission firms.

Average market prices of eggs in Adelaide, January 1st to December 31st:—1905, 10.18d. per dozen; 1906, 9.58d.; 1907, 10.18d.; 1908, 11.05d.; 1909, 11.31d.; 1910, 11.04d.; 1911, 11.69d.; 1912, 12.96d.; 1913, 12.06d.; 1914, 11.37d.; 1915, 15.74d.

Period During which the State can Export Oversea.

The foregoing table shows the average price realised by sellers of eggs in the city markets; and, of course, values are influenced by high prices in autumn and winter. The figures are given as items of interest, but what is of importance to know is the average price of eggs in Adelaide during the period when we can export. From September to the end of December each year prices are at the lowest level, for this is the period of highest egg yield; this factor is influenced largely by the heavy supplies received from farms where autumn and winter egg production is not a feature. The period is our glut season, and fortunately our geographical position allows us to export in our season of plenty, so that the eggs reach England when markets are bare and prices are at their highest.

Average prices realised in Adelaide markets during the period from September 1st to November 30th, and based upon the bi-weekly market reports (26 markets)—1905, 6.28d. per dozen; 1906, 6.14d.; 1907, 7.27d.; 1908, 8.15d.; 1909, 8.36d.; 1910, 7.27d.; 1911, 7.93d.; 1912, 9.77d.; 1913, 8.73d.; 1914, 7.85d.; 1915, 14.09d.; 1916, 8.92d. The 1915 figures reflect the disastrous drought, during which poultry throughout the State were sacrificed wholesale. There is an appreciable increase between the years 1905 and 1916; but there is no gainsaying the fact that the period under review is one of monotonously slack markets. There is just sufficient in the prospects of successful speculation to keep the markets at a bare level—the almost irreducible minimum. The slight rise is due, in my opinion, to cold storage facilities—the risks are less than in the old days of universal pickling; thus a slightly higher rate can be paid. When we look at the English figures we note that although a large proportion of the eggs imported are cheap, yet there must be, and of course is, a period of scarcity and of high prices.

Eggs in Shell or as Pulp.

It is my contention that we shall find a satisfactory market for all our surplus infertile first-grade eggs in England—shipped in the shell. The trial shipments years ago taught us what to do and what to avoid,

and when the time comes all the facilities are available for prosecuting that portion of the egg export trade, and at a profit. It is admitted that grading and packing eggs in the shell is a costly proceeding, and that eggs so packed are bulky, and cold storage freight is expensive. Notwithstanding we cannot afford—in the interests of our breeders—to ignore the possibilities of that avenue of trade.

Egg pulp is by no means a new feature in the egg trade. Over 20 years ago I drew attention to the trade in Russian pulp sent to England. It has many attractions, such as low cost of handling, freedom from breakages, and comparatively easy shipment and low freight. Eggs in the shell must be carried at a constant temperature; in pulp they are frozen hard and can go in any cold hold. Eggs in the shell must be shipped in a separate chamber—not only because of special temperature requirements, but also on account of extreme susceptibility to taints, due to various strong-smelling items of general cargo. It may be definitely stated again that the ravages of war in Europe will mean a shortage of supplies for some years—the result will be a higher average price for eggs. The recently reported shipments of egg pulp aggregating about 60,000 dozens of eggs eased our markets and precluded a slump, and at the same time proved a very profitable investment to the shippers. We are thus opening up that branch of the trade at a time when England's requirements are imperative and prices high. It would, of course, have been more in the interests of the industry if the eggs had been shipped on behalf of the producers. For my own part I congratulate the shippers on their enterprise and on the excellent results. As pioneers they deserve all praise for helping to blaze a track in the world's markets.

It is becoming evident that the wonderful possibilities of poultry and egg production as a factor in our national prosperity are at length receiving general, if tardy, recognition.

In this respect we can go forward with confidence in the work of settling our soldiers on the land as poultry breeders. At a future date I shall give information about the export of table poultry, for which there will be a very satisfactory outlook.

APPLYING A RED BLISTER.

The way to apply a red blister, consisting of one dram biniodide o mercury and seven drams lard—which is more effectual than mutto fat or vaseline—is to clip the hair short, put a little grease in th hollow of the heel to prevent the blister running into it, then to smea the blister over the joint all round and rub it in vigorously for at lea 10 minutes; then to tie the beast up on a double pillar rein, so that cannot get at the joint to gnaw it, or kick at anything with it, for hours. After this lapse of time the joint should be well greased, a a few hours later washed with soap and warm water, dried, a greased again, and the beast turned out for a month.—Fras. Eyell Place.

ADVISORY BOARD OF AGRICULTURE.

The monthly meeting of the Board, held on Wednesday, 13th December, was attended by Messrs. F. Coleman (chair), G. R. Laffer, M.P., C. J. Tuckwell, W. J. Colebatch, J. Miller, A. M. Dawkins, Professor Perkins, and H. J. Finnis (Acting Secretary).

Congress Resolutions

Various resolutions which had been submitted to and passed by the annual Congress were further dealt with by the Board. In regard to the proposal that all cold stored, pickled, or imported eggs should be branded, the Minister of Agriculture intimated that the Government intended to take no action.

The Minister also intimated that the Government did not approve the suggestion that jetty and wharfage tolls should be abolished on goods travelling from port to port within the State, and that maintenance should be met by direct taxation.

Drainage at Berri.

The Director of Irrigation furnished a report dealing with the question of provision of a drainage scheme for the Berri Irrigation Area, and mentioned therein the steps which had been taken by the Irrigation Department to effectively dispose of surplus waters, and also the lines which had been followed in the direction of discouraging the use of water in quantities prejudicial to the well-being of the area.

Women's Country Clubs.

Further consideration was given to the proposals submitted by the Secretary at the September meeting in regard to the inauguration of a scheme for promoting education of women on the farms by means of the formation of clubs. Action was deferred until a later meeting.

Conference of Dairy Factories.

It was reported that a very gratifying response had been received in regard to the proposed conference of representatives of dairy factories, and it was decided to request the Government to provide free rail fares to enable the representatives of factories to attend the conference.

West Coast Goods Traffic.

Consideration was given to a further minute from the Acting Railways Commissioner, dealing with the matter of transport of goods between the mainland and stations on the Eyre Peninsula railway. It was decided to seek information in reference to the practices adopted in other States in which similar conditions existed.

Eighty-six names were added to the rolls of existing Branches, and the Monteith Branch was formally closed.

THE AGRICULTURAL BUREAU.

THE TWENTY-SEVENTH ANNUAL CONGRESS.

(Continued from page 399.)

Third Day—Wednesday, September 6th.

CARE OF THE FARM MARE.

A paper by Mr. George Hill on the "Care of the Farm Mare" was read as follows:—

South Australia has just passed through one of the most trying times yet experienced by the majority of stockowners, and already the havoc played by the drought is being severely felt, raising the price of sheep and cattle to values that have exceeded the expectation of all. How long will it be before the horse market will receive its turn? Just at present the scarcity of money, and also the fact that sellers are asking cash payments for horse stock, are really pressing too hard on those that are struggling along, and patiently waiting for more capital from their last year's crop. Where terms are offered that will help a man over the coming harvest the market is very firm. When we take into consideration the horses purchased on account of the war—horses of good, sound ages—and the loss of thousands during the drought (and, further, it takes four years to put horses on the market), and the fact that very few breeders in South Australia have any young stock on hand, there must, without doubt, be a decided shortage in the course of a few years. Therefore it behoves all to take the greatest care of their mares and fillies, for they will find they will require them at a very early date. Some will say: "Look at the price of horses to-day: we are out of pocket by raising them. It is cheaper to buy than to raise them." No doubt it is at present if you only want the mongrel, as that class never brings the price of the good heavy draught. At present good draught horses, from three to five years old, are bringing from £30 to £35. This I consider is a good paying price for the breeder, but it pays always to try and raise the best. If you would rather have the mongrel to work, just keep a few good mares, raise good stock, sell them, buy the mongrel, and pocket the difference. Never breed the second rate horse. Now, as regards the care of the mare. This season we are hearing complaints from owners as to the small percentage of foals to be dropped. The owners of mares are inclined

to lay the blame on the entire owners, but it must he remembered that if the mares are not looked after and well cared for they will not produce as many foals as the owners often desire. Mares must always, if possihle, he kept in nice healthy condition, not be, as in a great many cases, that poor and weak they cannot do their part with success. Owners of mares should give every help to the man which is travelling the horse. This can he done in many ways. Always have your mares ready, see they are cleaned down, not muddy and sweating when the horse calls, and try if possible to spell them half a day after heing served. You often hear such remarks as these when out with your horse: "Mr. So-and-So has good luck; he always gets all his mares in foal." Well, my advice is, take a hint from this man. You will find his mares are always in a nice healthy condition, always look fresh, and are never over-worked or over-driven at any time. When mares are near foaling always keep them at steady work, and at night put them by themselves and feed with bran and chaff. You will hear men say: "I had bad luck. My mare had a foal all right, but the other horses, I think, killed it." Not bad luck at all, but bad and careless management. Never turn a mare when near foaling out at night on to green feed after working. She will be hungry, the feed dewy and gassy, and you will undoubtedly have trouble if you do so. Mares that are not working do not get so hungry; they always eat during the day. But not so with the mare working.

When the mare has foaled, if about at the time see that the foal sucks as soon as it is strong enough. If young mares are nervous and restless, tie them up and assist the foal. Coax it by rubbing the rump, and coaxing it to get hold of your finger near the udder. When you get the animal's lips close enough, milk a little on to them, and once he gets a taste of the milk he will be anxious to suck. Never try to force the foal; remember the old saying: "One man can lead a horse to water, 20 cannot make him drink." The same applies to the foal. Should your mare retain her cleanings, give her a bran mash with a teaspoonful of aconite. Be sure she eats it up, and in the majority of cases it will make her pass the cleanings. Clean the mare down now and again for a few days; it will freshen her up. Rub the foal about so that he will not be frightened of you. If handled often when young he will never forget it. Never let the foal want for feed at any time. From experience I find that foals always kept in nice condition when growing make the best constitutioned horses and the mares are better for breeding. Stock that is starved at an early age never furnishes up to as nice a heast as the animal that never has had a setback. With reference to the stallion, use the best not the cheapest. If possible breed from the best breeding strains you can get; blood

will tell. Do not be over enthusiastic on a horse that you see loaded with ribbons. The proof of the pudding is in the eating. With a horse it is his breeding, and time alone tells the tale in most cases. Some talk Suffolk, others Percheron, but I favor the heavy Clydesdale and the Shire. At present the horses that command the best prices are the good, heavy, cart horses. These are always in good demand, and we must try and raise the horse for which there is the best demand. If there are buyers for gunners at a better price, well, breed for the market; but the market in every country is the same—that is, for the good, heavy, cart horse. The horse we want is the beast that will pull his load up a hill, shaft it down, do it at a fair pace, and stand it. To do this we must have weight and strength. Remember always try and breed a better beast than your neighbour rears.

Discussion.

In the unavoidable absence of the writer of the paper, Mr. W. J. Colebatch, B.Sc., M.R.C.V.S., (Principal of the Roseworthy Agricultural College), replying to a number of questions which had been asked, said that the question of the earlist age at which to breed from mares was one on which there was difference of opinion. He thought three years was young enough. They were bred from at two years, particularly by stud breeders, where they wanted to find out the capacity of a mare as a breeder; but where that was done, they always endeavored to spare the mare the following year. For what term a mare should be spelled before foaling depended upon the temperament of the mare and the character of the work. On an average, he would say about a fortnight's spell before foaling would generally be of advantage to draught mares. In New Zealand it had been found that the man who caused the veterinary surgeons the most trouble was he who was too kind to his brood mares and did not work them at all. He had no faith in the system of calculating the time of foaling by the appearance of gum on the teats. In some cases it appeared right from the time of pregnancy. However, it might, if it appeared, say, at six or seven months, indicate that something had gone wrong with the mare. The cleansing of the mare was a most important thing at foaling time. If she did not get rid of her cleanings within 24 hours, then she would go through a critical time before she was right. He would advise breeders not to let their mares go in this regard more than 24 hours without giving them assistance. Speaking on the care of the foal, he said many foals were constipated at birth, and if that were not at once relieved the foal would not drink.

CO-OPERATION.

A paper on "Co-operation," the joint work of Messrs. M. L. Nolan and P. H. Knappstein, was read by Mr. Nolan, as follows:—

Never, probably, in the history of Australia has the need for economy and saving, both public and private, been so pressing. A huge war expenditure, resulting necessarily in an immense increase of taxation, together with a shrinkage of income, the result of a drought of unexampled severity, present a problem the solution of which may well tax our energies to the utmost. The margin between expenditure and income, in other words, savings, must somehow be largely increased.

There are two ways by which this necessary end can be attained. One is by increasing our production, which, granted remunerative prices, would result in a corresponding increase of income. But this result is largely dependent on Nature, and so, to a great extent, beyond our control. The other is to reduce our outlay, so that by economy we attain the same end of an increased margin of savings. Here we are on surer ground, for this means rests largely with ourselves; and of all ways leading to this end none offers greater promise than co-operation.

Delegates may remember that a paper was read at the 1914 Congress advocating co-operative purchase of farm machinery, manures, &c., through Bureau Branches, which ultimately was referred to the Branches for consideration, with a view to its further discussion at the next Congress. Judging by *Journal* reports, the question has been very freely discussed by Branches, besides which nearly 100 have communicated directly with the Clare Branch on the matter. This general interest tends to show that producers are becoming more alert to the advantages of co-operative effort.

Before considering the matter further, it may be as well to refer to some misconceptions as to the nature of our proposal. What we suggested was that Branches should form themselves into co-operative unions for the purchase of all instrumentalities and requisites of production from wholesale houses and manufacturers direct, thus saving commissions and trade discounts. But some Branches, apparently thinking it applied only to manures, shelved further consideration, because the members had already bought all they needed. Were manures the only commodity to be purchased it would not be worth while, for the possible saving on that line is small, and not to be compared with that on machinery and general requisites. Others, again, were averse on the ground that there were other co-operative concerns in existence which should be supported. Yet our suggestion is certainly not opposed, but rather should be helpful, to the spirit of

co-operation which finds concrete expression in co-operative businesses. But, if it be possible by combination for members and producers generally to make the savings indicated, it seems to us that they have a legitimate right to do so.

The principal points in favor of our proposal are:—

Simplicity and ease of working.
No capital required.
No risks.
Material financial gain.
Education in the advantages of co-operative union.

As regards the mode of working, one was indicated in the 1914 paper. But it has been suggested that were the Bureau to embark on an enterprise of this nature, it would be an unjustifiable departure from its original and real objects, and might attract opposition and enmity, and even cause discord in the Branches. To avoid the possibility of this, the members of a Branch could form themselves into a Co-operative Union, open to all producers, whether members of the Bureau or not. Such union would appoint one of its members as secretary, who would be the recognised agent for the wholesale houses and manufacturers and through whom all orders would pass. It would be preferable and more convenient were be a resident of the town. As the laborer is worthy of his hire, the secretary should be paid for his work, say, a proportion—to be agreed on—of the commissions and discounts saved.

This system would approximate fairly closely to that of the Farmers' Unions in Victoria, of which about 100 are in existence. These unions are formed of producers conveniently close to each other in various country centres to purchase direct from manufacturers and importers, thus saving the middleman's profit. A member is appointed agent by the various firms from which they wish to buy, as also by stock agents and insurance companies. These unions are regarded with favor by the big Melbourne firms. The savings made on purchases are paid to the individual purchasers. In saying that these savings would average from 7½ per cent. to 10 per cent. we feel sure we are on the safe side, and Victorian experience is confirmatory. These savings, and the object lesson presented by this simple form of co-operation, would probably lead to a great extension of the co-operative spirit, so that other phases of this many-sided movement would be gradually taken up.

The members of the Clare Branch have been practising this form of co-operation for the past two years on the basis outlined, and have found results, on the whole, commensurate with expectations. Our purchases covering a fairly wide range, appreciable savings have been

made. Were the system to be adopted generally by producers, its field of usefulness would naturally be increased, as the majority of importing firms and manufacturers would probably come into line with the movement. Our experience has shown it to be a simple and practicable method of lessening costs to the man on the land, and we submit it to the favorable consideration of delegates and producers generally.

FREE PARLIAMENT.

FLAX FOR LINSEED.

In reply to a question, the Director of Agriculture, Professor A. J. Perkins, said that flax for linseed could be grown in the best districts, where the rainfall average was not less than 20in.

IMPORTED EGGS.

Mr. E. W. Beythien (Longwood Branch) proposed—"That in the opinion of this Congress it should be made compulsory by law to mark or stamp all cold-stored, imported, or pickled eggs, when offering them for sale. And, further, that all importations of eggs, whether in shell or pulp, from China, be absolutely prohibited."

Mr. R. H. Cooper (Riverton Branch) seconded the motion.

After discussion it was decided to alter the word "China" to "Asiatic countries." It was further decided to divide the resolution into two parts—(*a*) that referring to the stamping of eggs, and (*b*) that referring to the importation of Asiatic eggs. Resolution (*a*) was carried, and resolution (*b*) was referred to the branches.

F.A.Q. WHEAT STANDARD.

Mr. W. Cummings (Belalie North Branch) moved—"That in the opinion of this Congress it is desirable that the f.a.q. standard of wheat should be uniform throughout the Commonwealth."

Mr. W. J. Venning (Crystal Brook Branch) seconded the motion, which, after some discussion, was defeated.

RABBIT DESTRUCTION.

Mr. V. W. Gardner (Koppio Branch) moved—"That in the opinion of this Congress it is desirable that Government inspectors, free of local control, be appointed to deal with the rabbit destruction question."

Mr. G. B. Gardner (Koppio Branch) seconded the motion.

Considerable discussion ensued, in which Messrs. J. K. Deer (Port Germein), T. O'Donohue (Amyton), A. O. Dawkins (Elbow Hill),

E. B. Pitman (Wirrabara), E. S. Matthews (Angaston), A. V. Nairn (Mallala), W. H. Smith (Naracoorte), A. Jamieson (Yongala Vale), and H. Sanders (McNamara Bore) participated, the general expression of opinion being adverse to the proposal.

The motion was lost.

JUDGING AT AGRICULTURAL SHOWS.

Mr. John Gray (Claypan Bore Branch) moved—"That the judging of livestock and implements at agricultural shows subsidised by the Government should be on a system of points to be shown on cards."

Mr. G. S. Hayman (Lameroo Branch) seconded the motion, which was carried by a large majority.

FERTILISERS IN BAGS.

Mr. A. Phelps (Clarendon Branch) moved—"That we urge upon the Government the necessity for provision that all fertilisers should be sold in bags, not exceeding 1cwt. in weight."

Mr. C. Ricks (Cherry Gardens Branch) seconded the motion, which was lost.

GOVERNMENT SUPPLY OF CORNSACKS.

On behalf of the Bundaleer Springs Branch Mr. J. Laurie moved—"That as the Government have taken entire control of the disposal of wheat, we respectfully request that they also take control of the supplying of cornsacks."

Mr. J. Travers (Bundaleer Springs) seconded the motion.

The Minister of Agriculture said the Government made inquiries with reference to the price at which cornsacks could be landed in Adelaide. They were given to understand that the merchants were making very little profit on bags. If further proof were wanted, they had the Farmers' Co-operative Union handling cornsacks, and if they could deliver bags to them at bedrock prices there was no need for the Government to go into the business.

The motion was lost.

JETTY TOLLS.

Mr. L. Aunger (Miltalie) moved—"This Congress is of the opinion that it is in the interests of the primary producer that all jetty and wharfage tolls should be abolished on goods travelling from port to port within the State, and that maintenance be met by direct taxation."

Mr. G. E. Opitz (Yaninee) seconded the motion, which was carried.

VETERINARY LECTURER.

Mr. W. H. Smith (Naracoorte) proposed—"That it be a recommendation from this Congress that the Minister of Agriculture place

at the disposal of the Government Veterinary Lecturer (Mr. Place) an automobile, to facilitate his movements through the country, thus enabling him to increase the good work he is carrying out."

Mr. C. Ricks (Cherry Gardens) seconded the motion. Carried.

WHEAT FOR HOME CONSUMPTION.

Mr. C. S. Lee (Paskeville) proposed—"That this Congress disapproves of the action of the Wheat Board in fixing the price of wheat for home consumption at below the London parity."

Mr. W. R. Whittaker (Port Broughton) seconded.

The Minister of Agriculture said the wheat scheme had been entered upon primarily in the interests of the farmers, but also in the interests of Australia as a whole. Had it not been for the scheme bread would have been cheaper in Australia than it had been during the last nine months. If the motion were carried, it would be a dangerous thing. If an attempt were made to raise the price in Australia, it might result in a contrary effect, and lead to prices considerably below those now being obtained. It had been decided to allow the Bureau to nominate a representative to a seat on the Wheat Board, not because the Government lacked confidence in what had been done, but because it was desired that they should know what was going on, and have absolute confidence in what was being done.

The motion was negatived.

BREAKING RAILWAY JOURNEYS.

On the motion of Mr. J. Brewster (Quorn) it was resolved—"That this Congress requests the Railways Commissioner to allow the delegates to break their forward journey on their Congress tickets."

SOUTH AUSTRALIAN SOLDIERS' FUND.

On the motion of Mr. W. H. Richardson (Wynarka), it was resolved—"That every Agricultural Bureau member should set aside a definite acreage of the coming harvest, the proceeds from which should be devoted to the South Australian Soldiers' Fund."

VOTE OF THANKS.

A vote of thanks was accorded to those who had read papers, to the officers of the Agricultural Department, the Minister of Agriculture, and the Chairman. The proceedings closed with the National Anthem.

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF DECEMBER.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—The beginning of the month was very wet, but the last fortnight has been fine with warm days and dewy mornings. Crops—The rains of this month, followed by the warm days, have tended to ripen the crops off rather more quickly than was expected, and reaping will be general by the beginning of the year. Natural Feed—Feed has remained green very late this year, and good green feed is still in the fields. Stock have been very free from illness and are in good condition. Pests—Brown beetles have appeared in swarms, and during the evening are like swarming bees.

Eyre's Peninsula.—The weather has been moderately cool, with only a couple of short, hot spells. Two light rains were recorded, registering 12 points, which have carried the total rainfall for the year over the 18in. mark. Winds have been plentiful, but fairly steady, and chiefly from the south and west. Crops—Harvesting has been in full swing all the month, but somewhat handicapped by the cool weather and lodged condition of some wheats. Some varieties have also shaken a portion of their grain, but, on the whole, the bulk of the grain is being secured. A good weighing sample of grain is being obtained, and yields are exceeding expectations, some plots of wheat registering over 30bush. to the acre, whilst it is anticipated that the average will be over 20bush. Natural feed is dry, but plentiful.

Kybybolite.—Weather—The wet conditions experienced in November continued up to the 14th instant, since when it has been fine and warm with southerly winds. Crops—Haymaking was delayed by the rain, and cutting will hardly be completed this month. The crops generally have ripened off very quickly, and it was impossible for farmers to get the hay cut before it was past the best stage of ripeness. Oats are now ready for stripping, also some early wheats. Diseases have been notable for their absence, and yields should be quite up to expectations. Natural feed has dried off, but is so abundant that great anxiety is felt from the danger of fires. Stock are in good order, sheep especially being much improved.

Turretfield.—The weather during the first half of December was very changeable, and unsuitable for haymaking. Up to the 14th 113 points of rain were registered. During the latter half of the month the weather became more seasonable. On the 27th a short thunderstorm accompanied by a heavy wind did considerable damage to the crops, but only 9 points of rain fell. Crops that were dead ripe and liable to shake lost a considerable amount of grain. Difficulty is being experienced in reaping the crops this season, as most crops have gone down more or less owing to the heavy weather in late spring. False combs are essential. All crops are turning out very well. Natural feed has dried off very quickly during the past fortnight, but there is still an abundance of it. Stock are healthy and in fair to good condition. Miscellaneous—Harvesting operations are in full swing. With the advent of hot weather all crops ripened very quickly, and the farmers had to start stripping before they had completed hay carting. A large quantity of hay is still lying stooked in the fields.

Veitch.—Weather—The weather has been remarkably cool, and very changeable for this time of the year; 109 points of rain have fallen during the month. Veitch average for the month is 68 points; total rain for year, 16.69; average for year, 12.53. Crops—Harvesting work is in full swing right through the district. Some of the early varieties of wheat are not standing the rough weather very well. Natural feed is drying off. Stock—All in healthy condition.

DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on January 2nd:—

BUTTER.—A steady shrinkage in supplies of butter occurred during the month of December, and the export of first grade has consequently been prohibited. Seconds and thirds, however, continue to be produced in excess of local demand, and from all appearances there will be a surplus in these lines for some little time to come. In tops, South Australia is already importing from the eastern States to make up the shortage. Local rates, in prints, at the close of the month, in accordance with the Federal proclamation, were "Alfa," 1s. 4½d.; "Primus," 1s. 4½d. per lb.; while choice separators and dairies, 1s. 2¾d. to 1s. 3½d.; well-conditioned store and collectors', 1s. 1d. to 1s. 1½d.; weather-affected lots down to 1s. per lb.

EGGS.—Consignments continued to arrive throughout the month in substantial quantities, and in the absence of any spells of hot weather the quality was, on the whole, satisfactory. Values have fluctuated slightly, rates being now a shade easier than they were a month ago, owing to picklers having concluded their operations. Quotations loose at mart—Hen, 9d.; duck, 10½d. per dozen.

CHEESE.—The consignments of cheese received during December again constituted a record, and under the stimulus of interstate orders prices hardened, ruling rate now being 8d. to 8¾d. per lb. for large to smaller sizes.

HONEY.—Demand for this line has maintained steadily, and in consequence values show no material alteration, being now 3½d. to 4d. per lb. for prime clear extracted, while beeswax continues to find ready sale at 1s. 5d. to 1s. 6d. per lb.

ALMONDS are very scarce, awaiting the arrival of the new crop. Prices are nominally—Brandis, 10d.; mixed softshells, 9d.; hardshells, 5d.; kernels, 1s. 7d. per lb.

BACON.—The usual December demand for both bacon and hams ruled, and market maintained at previous rates; best factory-cured sides, 11d. to 1s.; hams, 1s. 2d. to 1s. 3d. per lb.

LIVE POULTRY.—Supplies were quite equal to quantities coming forward this time 12 months ago, and for all quality birds good competition was experienced, very satisfactory prices ruling. Good table roosters, 4s. 6d. to 5s. each; nice-conditioned cockerels, 3s. to 3s. 6d.; plump hens, 2s. 6d. to 3s.; light birds, 2s. to 2s. 3d.; ducks, 2s. to 4s. 3d.; geese, 5s. 6d. to 8s. each; pigeons, 6d. each; turkeys from 9d. to 1s. 4d. per lb. live weight for medium to good table birds.

POTATOES AND ONIONS.—Large supplies of potatoes have come to hand from the Adelaide plains, and prices have eased to a point which must be exceedingly unprofitable to growers. In the Mount Gambier district digging operations have just begun, and according to the present outlook this State will not require to import potatoes for some months to come. ONIONS.—Locally-grown onions have also offered freely, and there are no indications of any falling off in supplies for another month or two. Potatoes, £4 10s. to £5 10s. per ton on rails Mile End. Onions, £6 to £7 per ton on rails Mile End.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall for the month of and to the end of December, 1916, also the average precipitation to the end of December, and the average annual rainfall.

Station.	For Dec., 1916.	To end Dec., 1916.	Av'ge. Annual Rainfall
Far North and Upper North.			
Oodnadatta	0·23	8·69	4·76
Tarcoola	0·03	7·92	7·58
Hergott	—	5·55	6·04
Farina	—	7·27	6·70
Leigh's Creek ...	0·54	8·43	8·66
Beltana	0·53	8·36	9·22
Blinman	0·34	12·62	12·83
Hookina	0·36	19·02	—
Hawker	0·42	17·99	12·22
Wilson.....	0·63	18·40	11·78
Gordon	1·23	14·44	10·26
Quorn	0·73	19·62	13·78
Port Augusta....	0·66	11·13	9·46
Port Augusta W..	0·75	11·42	9·36
Bruce	1·10	13·07	10·01
Hammond	0·88	13·42	11·46
Wilmington	2·03	23·87	18·26
Willowie	0·95	15·60	11·90
Melrose	1·68	34·49	23·04
Booleroo Centre..	0·74	19·88	15·83
Port Germein ...	2·27	15·98	12·84
Wirrabara.....	2·02	30·79	18·91
Appila	1·27	18·43	15·08
Cradock	1·26	13·74	10·86
Carrieton	1·18	16·04	12·22
Johnburg	0·67	12·04	10·21
Eurelia	0·82	17·40	13·24
Orroroo	1·85	17·73	13·42
Black Rock	1·26	16·23	12·25
Petersburg	1·24	17·95	13·07
Yongala	1·53	20·73	13·94
North-East.			
Ucolta	0·93	14·86	—
Nackara	1·09	11·76	—
Yunta	0·62	8·19	8·22
Waukaringa	0·39	9·64	7·94
Mannahill	0·45	8·34	8·46
Cockburn	0·59	9·35	7·97
Broken Hill, NSW	0·08	10·17	9·63
Lower North.			
Port Pirie	2·30	19·50	13·21
Port Broughton .	0·37	19·84	14·33
Bute	0·86	22·88	15·42
Laura	1·58	24·01	18·22
Caltowie	1·39	22·30	17·27
Jamestown	1·65	23·64	17·46
Gladstone	1·71	20·80	16·00
Crystal Brook....	1·48	22·97	15·62
Georgetown	1·59	23·25	18·32
Narridy	1·08	17·96	16·79
Redhill	0·65	21·80	16·79
Spalding	1·60	26·57	20·25
Gulnare	1·43	23·57	19·74

Station.	For Dec., 1916	To end Dec., 1916.	Av'ge. Annual Rainfall
Lower North—*continued.*			
Bundaleer W. Wks.	1·76	24·18	17·29
Yacka	0·92	20·16	15·27
Koolunga	0·82	20·08	15·94
Snowtown.....	1·22	24·95	15·70
Brinkworth	1·24	23·89	15·48
Blyth.....	1·66	23·93	16·34
Clare	2·53	34·25	24·30
Mintaro Central..	2·46	36·43	21·99
Watervale.....	3·66	41·28	27·17
Auburn	3·41	33·01	24·25
Hoyleton	2·59	24·26	17·96
Balaklava	1·27	19·20	16·03
Port Wakefield ..	1·25	19·14	13·13
Terowie	1·04	16·22	13·71
Yarcowie	0·95	17·48	13·91
Hallett	2·04	19·34	16·40
Mount Bryan ...	3·62	27·22	15·73
Burra	2·56	27·54	17·82
Farrell's Flat	1·93	25·57	18·87
West of Murray Range.			
Manoora	2·44	28·12	18·09
Saddleworth	2·18	24·50	19·69
Marrabel	1·60	31·27	18·94
Riverton	2·13	30·41	20·48
Tarlee	1·96	24·91	17·48
Stockport	1·76	24·85	15·89
Hamley Bridge ..	1·73	22·98	16·45
Kapunda	1·40	28·37	19·67
Freeling	1·62	25·96	17·85
Greenock	1·38	34·92	21·46
Truro.....	1·10	27·79	19·74
Stockwell	1·15	28·15	20·30
Nuriootpa	1·39	29·76	21·26
Angaston	1·11	32·51	22·25
Tanunda	1·12	29·59	22·28
Lyndoch	0·85	28·84	23·01
Williamstown....	0·67	33·94	—
Adelaide Plains.			
Mallala	0·94	19·58	16·88
Roseworthy	1·28	23·07	17·31
Gawler	1·02	26·26	19·21
Two Wells	0·68	19·36	16·36
Virginia.....	0·99	22·88	17·58
Smithfield	0·87	22·22	17·30
Salisbury	1·23	25·62	18·57
North Adelaide ..	1·86	32·01	21·49
Adelaide	1·67	28·16	21·04
Seaton (Grange)..	0·91	21·87	—
Unley	1·07	29·75	—
Rose Park	1·07	31·34	—
Brighton	1·24	29·96	19·93
Glenelg	0·85	23·72	18·35
Magill	1·03	27·82	25·69

RAINFALL—*continued.*

Station.	For Dec., 1916.	To end Dec., 1916	Av'ge. Annual Rainfall
ADELAIDE PLAINS—*continued.*			
Glen Osmond ...	1·27	34·45	25·26
Mitcham	1·08	30·88	23·47
Belair	1·26	34·84	28·64
MOUNT LOFTY RANGES.			
Paradise	0·82	27·53	—
Teatree Gully....	0·94	33·82	28·19
Stirling West ...	2·12	56·39	46·79
Uraidla	1·52	55·66	44·35
Clarendon	1·20	37·49	33·67
Morphett Vale ..	0·62	27·28	23·32
Noarlunga	0·67	26·35	20·28
Willunga	0·86	29·94	25·98
Aldinga	0·64	24·40	20·34
Myponga.....	1·37	38·61	—
Normanville	0·71	26·30	20·65
Yankalilla.....	0·88	32·05	22·78
Cape Jervis	0·24	16·23	16·34
Mount Pleasant .	1·04	34·95	26·87
Blumberg	0·82	36·57	29·38
Gumeracha	0·99	39·59	33·30
Millbrook Reservr.	0·84	41·00	—
Lobethal	1·16	45·69	35·38
Woodside	1·30	36·52	31·87
Habndorf.....	1·20	35·84	25·45
Nairne	1·17	30·78	28·83
Mount Barker ...	1·69	39·06	30·93
Echunga	1·21	39·34	32·83
Macclesfield	1·42	36·64	30·72
Meadows	2·24	49·71	35·52
Strathalbyn	1·53	23·65	19·28
MURRAY FLATS AND VALLEY.			
Wellington	1·49	18·87	15·01
Milang	0·62	16·79	16·08
Langhorne's Brdg	0·69	15·80	15·27
Tailem Bend	1·67	18·48	—
Murray Bridge ..	1·42	15·82	14·32
Callington	1·12	18·18	15·65
Mannum	0·66	15·36	11·67
Palmer	0·58	18·38	15·60
Sedan	0·58	16·65	11·92
Swan Reach	1·57	15·58	—
Waikerie	0·49	12·54	—
Blanchetown	0·55	9·75	10·71
Endunda.....	1·53	26·05	17·33
Sutherlands	1·06	17·34	10·60
Morgan	0·51	12·59	9·29
Overland Corner .	0·76	10·60	11·42
Renmark	0·52	13·18	10·93
Loxton	0·88	15·57	—
WEST OF SPENCER'S GULF.			
Eucla.....	0·16	10·95	10 13
White Well.....	0·09	11·39	9·67
Fowler's Bay	0·23	14·50	12·11
Penong.....	0·15	19·19	11·93
Murat Bay	0·08	14·20	—
Smoky Bay	0·07	14·30	—
Streaky Bay.....	0·05	15·89	15·31
Port Elliston	0·47	18·98	16·49

Station.	For Dec., 1916	To end Dec., 1916.	Av'ge. Annual Rainfall
WEST OF SPENCER'S GULF—*continued.*			
Port Lincoln	0·82	24·18	19·88
Tumby Bay	0·55	17·30	15·00
Carrow	0·65	19·40	—
Cowell	0·38	13·07	11 76
Point Lowly.....	1·42	15·02	12·21
Petina	0·16	14·57	—
Hummock Hill ..	0·99	14·61	—
Talia	0·41	19·41	—
Cummins	0·30	22·18	—
Arno Bay	0·26	15·65	—
Cleve	0·09	17·01	—
YORKE'S PENINSULA.			
Wallaroo.....	0·45	18·98	14·05
Kadina	0·53	22·42	15·88
Moonta	0·36	22·13	15·22
Green's Plains ...	0·81	21·18	15·73
Maitland	0·50	30·66	20·08
Ardrossan	0·35	19·82	13·89
Port Victoria ...	0·66	22·78	15·20
Curramulka	0·33	21·22	18·51
Minlaton	0·56	25·71	17·41
Stansbury	0·47	21·18	17·06
Warooka	0·48	23·10	17·71
Yorketown	0·33	21·92	17·47
Edithburgh	0·40	22·78	16·48
Port Vincent	0·28	20·56	—
SOUTH AND SOUTH-EAST.			
Cape Borda	1·17	29·74	25·09
Kingscote	0·75	23·19	18·95
Penneshaw	0·63	22·76	21·34
Cape Willoughby..	0·97	27·85	19·69
Victor Harbor ...	1·03	22·37	22·18
Port Elliot	1·06	21·71	20·33
Goolwa	0·97	22·99	17·93
Pinnaroo	1·01	21·15	16·74
Parilla	0·66	19·25	—
Lameroo	1·82	22·29	16·55
Parrakie	1·25	18·59	—
Geranium	1·13	22·06	—
Peake	1·42	21·77	—
Cooke's Plains ..	0·90	21·87	14·74
Coomandook	1·16	24·14	—
Kalangadoo	2·17	36·85	18·87
Meningie	0·87	24·78	17·19
Coonalpyn	1·21	23·33	16·50
Tintinara	2·15	25·68	18·78
Keith.....	1·63	22·69	—
Bordertown	1·50	22·42	19·76
Wolseley	2·67	23·77	17 72
Frances	1·97	21·58	20·74
Naracoorte	1·39	24·79	22·66
Penola	2·11	28·80	26·78
Lucindale	1·55	23·90	23·32
Kingston.....	1·54	25·89	24·73
Robe	1·11	30·45	24·69
Beachport.....	0·96	33·54	27·51
Millicent	1·81	36·76	29·25
Mount Gambier .	2·00	32·96	32·00
C. Nrthumberland	1·46	29·40	26·63

AGRICULTURAL BUREAU REPORTS.

INDEX TO CURRENT ISSUE AND DATES OF MEETINGS.

Branch.	Report on Page	Dates of Meetings. Jan.	Feb.
Amyton	*	—	—
Angaston	*	—	—
Appila-Yarrowie	*	—	—
Arden Vale & Wyacca	*	—	—
Arthurton	*	—	—
Balaklava	*	—	—
Beaufort	*	—	—
Beetaloo Valley	499	—	—
Belalie North	*	—	—
Berri	509	10	7
Blackheath	510	6	3
Blackwood	*	15	19
Blyth	*	13	—
Bookpurnong East	*	—	—
Booleroo Centre	*	—	3
Borrika	*	—	—
Bowhill	*	—	—
Brentwood	*	4	1
Brinkley	509	—	—
Bundaleer Springs	*	—	—
Burra	*	—	—
Bute	*	—	—
Butler	*	—	—
Caltowie	*	—	—
Canowie Belt	*	—	—
Carrieton	*	—	—
Carrow	*	—	—
Cherry Gardens	†	2	6
Clanfield	*	—	—
Clare	*	—	—
Clarendon	*	—	—
Claypan Bore	*	—	—
Colton	*	—	—
Coomandook	*	—	—
Coomooroo	*	—	—
Coonalpyn	509	—	—
Coonawarra	*	—	—
Coorabie	*	—	—
Cradock	*	—	—
Crystal Brook	*	—	—
Cummins	*	6	—
Cygnet River	511	4	1
Davenport	*	—	—
Dawson	*	—	—
Denial Bay	*	—	—
Dowlingville	*	—	—
Edillilie	*	—	—
Elbow Hill	*	—	—
Eurelia	*	—	—
Forest Range	*	—	—
Forster	509	—	—
Frances	524	—	—
Freeling	*	—	—
Gawler River	*	—	—
Georgetown	*	—	—
Geranium	510	27	24
Gladstone	*	—	—
Glencoe	517	—	—
Glencope	*	—	—
Goode	505	—	—
Green Patch	*	—	—
Gumeracha	*	—	—
Halidon	*	—	—
Hartley	517	3	7
Hawker	499	9	6
Hilltown	501	—	—
Hookina	*	2	6
Inman Valley	511	16	1
Ironbank	†	—	—
Julia	*	—	—
Kadina	*	—	—
Kalangadoo	*	13	10
Kanmantoo	517	6	3
Karoonda	*	—	—
Keith	*	—	—
Ki Ki	506	—	—
Kingscote	*	—	—
Kingston-on-Murray	506	—	—
Kongorong	519	2	6
Koonibba	503	2	6
Koppio	505	—	—
Kybybolite	*	4	1
Lameroo	*	—	—
Laura	*	—	—
Leighton	*	—	—
Lone Pine	501-2	—	—
Longwood	†	—	—
Loxton	*	—	—
Lucindale	*	—	—
Lyndoch	503	—	—
MacGillivray	‡	—	—
Maitland	*	—	—
Mallala	502	—	12
Mangalo	*	—	—
Mantung	†	—	—
Meadows South	512-13	2	6
Meningie	*	—	—
Milang	513	—	—
Millicent	*	9	—
Miltalie	*	6	3

INDEX TO AGRICULTURAL BUREAU REPORTS—*continued.*

Branch.	Report on Page	Dates of Meetings. Jan.	Feb.	Branch.	Report on Page	Dates of Meetings. Jan.	Feb.
Mindarie	*	—	—	Port Pirie	*	—	—
Minlaton	503	*5	2	Quorn	*	—	—
Minnipa	504	13	10	Ramco	508	.	—
Mintaro	500	6	3	Redhill	*	—	—
Mitchell	*	-	—	Renmark	*	—	—
Monarto South	510		—	Riverton	*	—	—
Monteith	*	—	—	Roberts and Verran	*	—	—
Moonta	*	—	—	Rosenthal	*	—	—
Moorlands	*	—	—	Rosy Pine	*	—	—
Morchard	498	—	—	Saddleworth	*	—	—
Morgan	510	—	—	Salisbury	*	—	—
Morphett Vale	*	—	—	Salt Creek	*	—	—
Mount Barker	517	3	7	Sandalwood	†	—	—
Mount Bryan	*	—	—	Sberlock	*	—	—
Mount Bryan East	*	—	—	Spalding	*	—	—
Mount Compass	*	—	—	Stirling's Well	†	—	—
Mount Gambier	*	—	—	Stockport	*	—	—
Mount Hope	505	—	-	Strathalbyn	516	2	6
Mount Pleasant	*	—	—	Sutherlands		—	—
Mount Remarkable	498	—	—	Tantanoola	*	—	—
Mundalla	*	10	—	Tarcowie	*	—	—
Mundoora	*	—	—	Tatiara	*	—	—
Murray Bridge	‡	—	—	Tintinarra	*	-	—
Mypolonga	*	3	-	Two Wells	*	—	—
Myponga	*	—	—	Uraidla and Summert'n	*	—	—
Myrtle	*	—	—	Waikerie	†	—	—
McNamara Bore	507	—	—	Warcowie	*	—	—
Nantawarra	*	—	—	Warrow	505	—	—
Naracoorte	519-21	—	—	Watervale	503	—	—
Narridy	*	—	—	Wepowie	‡	6	3
Narrung	*	—	—	Whyte-Yarcowie	*	—	—
Netherton	507	—	—	Wilkawatt	*	—	—
North Booborowie	*	—	—	Willowie	*	—	6
North Bundaleer	*	—	—	Wilmington	*	—	-
Northfield	*	—	6	Wirrabara	501	—	—
Orroroo	‡	—	—	Wirrega	*	—	—
Parilla	*	4	1	Wollowa	*	—	—
Parilla Well	*	-	—	Woodleigh	*	—	—
Parrakie	*	—	—	Woodside	516	—	—
Paskeville	*	—	—	Wynarka	*	—	—
Penola	*	—	—	Yabmana	*	—	—
Penong	*	13	10	Yacka	*	—	—
Petina	*	—	—	Yadnarie	504	—	—
Pine Forest	*	—	—	Yallunda	*	—	—
Pinnaroo	*	—	—	Yaninee	*	—	-
Pompoota	507	11, 25	—	Yeelanna	*	—	—
Port Broughton	*	—	—	Yongala Vale	*	—	5
Port Elliot	514, 517	20	17	Yorketown	*	—	—
Port Germein	*	—	—				

*No report received during the month of December. † Formal report only received.
‡ Held over until next month.

ADVISORY BOARD OF AGRICULTURE.

Date of Meeting—February 14th, 1917.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA.

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD.)

MOUNT REMARKABLE.

December 6th.—Present: 10 members.

CO-OPERATIVE BUTTER FACTORY *v.* PRIVATE DAIRY.—Commencing with the declaration that a butter factory could be kept in operation in that district throughout the year, Mr. G. Casley, in a paper dealing with the relative merits of the co-operative butter factory and the private dairy, said that now that the Government had purchased the Willowie Estate, comprising some of the best land, an effort should be made to establish a factory there, because of its central situation, and if the proposed training farm for soldiers were successful it could keep the factory going itself. The railway could now carry the milk in cool cars, whereas formerly, if the weather were hot it had to be taken to Laura by night. If the Government would not build a factory one could be erected by the farmers for £1,000, and with another £250 for incidental and working expenses, the sum of £1,250 would be required. Within a radius of six miles from the factory there were between 25 and 30 fairly sized private dairies, or families partly engaged in dairy pursuits. If 25 families subscribed £50 each, all of which would not be required at once, the requisite amount would be provided. When the factory was established the only work on the farm would be to feed and milk the cows and cart the milk to the factory. By arrangement the farmers could collect the milk on their side of the factory week about. Then one class of butter only would be produced instead of 25 different kinds; the butter would be done up in uniform style and a better price would be obtained. In nearly all private dairies there was some drawback, and the work of milking, feeding, cleaning, skimming, churning, making up the butter and taking it to the store made a continuous round of work for fully 50 people, whereas, in a factory, only half a dozen were employed—a great saving of labor. Mr. S. Challinger said that the cost of labor was too great for farmers to make the milking of many cows profitable. Mr. H. S. Brumby said that the collection of the milk could be managed by the farmers carrying it week about to the factory. Mr. W. H. McGuire said that in the district in New South Wales from which he came a factory costing £1,100 treated the produce of 500 cows. Mr. N. S. Giles said that in New South Wales he had noticed stagings upon which the milk or cream cans stood waiting for the carrier of the week to lift them into his vehicle and take them to the factory.

MORCHARD (Average annual rainfall, 11in. to 12in.).

November 18th.—Present: 15 members and two visitors.

PIGS ON THE FARM.—The essentials in profitable pig raising, premised Mr. F. Scriven in a paper entitled, "Pigs on a Farm," were plenty of feed, given regularly, and a clean, well-ventilated warm sty. To thrive well pigs should be fed three times per day, and they would do well on wheat, barley, or pease with plenty of clean, fresh water. For a pig yard, he preferred about half an acre of dry land, fenced strongly with heavy wire netting. A line of barbed wire should be laid about 2in. below the surface, and the netting should be fastened securely to it. That would prevent the pigs burrowing underneath. In one half of the enclosure a stone sty with a straw roof should be built and divided into two compartments sufficiently large to house a sow and litter or three pigs for fattening purposes.

In the yard, a small straw stack should be placed for the use of the pigs as they wished, and it would be found very warm for them in cold weather. The other portion of the yard should be used for growing green feed. If sown with barley or rape to catch the first rains and kept closed until the crop was well started, the pigs running out would do well on the green feed with little else. Mr. Kitto disapproved of using wide-meshed wire netting for pig yards. Mr. H. Brown said that wire netted pig yards required to be securely constructed. Mr. G. Gregory said that pigs thrived better in yards than in close quarters. Mr. J. W. Riechstein thought that sows should not be mated until 10 months old. Pigs should be given plenty of charcoal. Mr. B. S. McCallum considered that sows with young should be given as much food as they could eat. Mr. H. G. Kupke observed that pigs with good sides should be selected for ham and bacon. Bacon pigs should not be more than 12 months old.

THE HAY HARVEST.—It was necessary to prepare for hay cutting some time before the crop was ready, observed Mr. B. S. McCallum in a paper on the hay harvest. The twine, duplicate parts, and oil should be in hand days before required, and the binder thoroughly overhauled. The hay yard also needed attention, and all refuse, such as damaged straw, &c., should be removed. All green growth should be cleared off. The base for the stack should be covered with timber if possible, but if timber were difficult to obtain a thick layer of straw might answer the purpose. Old kerosine tin buckets, filled with stones, made very good weights for affixing to the wires placed over the stacks, and if well cared for, would last for years. The paper then proceeded to deal with the matters that should receive attention in connection with the harvesting of the crop. Discussion followed, in which Messrs. J. W. Riechstein, F. Scriven, Kitto, Brown, W. Tigden, and R. Jasper took part.

HAWKER, November 14th.—Mr. H. C. Condon read a paper entitled "Why farmers do not attend the Bureau," in which he pointed out the good work which was possible if the farmers came together and presented a united front on all matters which concerned them. The Agricultural Bureau afforded a means for the farmers to come together, but they did not avail themselves of its advantages sufficiently.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BEETALOO VALLEY (Average annual rainfall, 18in. to 19in.).

November 13th.—Present: six members and one visitor.

POULTRY BREEDING.—After recommending White and Brown Leghorns, Minoreas, and Andalusians as layers; Wyandottes, Orpingtons, and Plymouth Rocks for general purposes; and Brahmas, Dorkings and Game for table birds, Mr. W. Berry, in a paper on poultry breeding, advised that in breeding for egg production the settings should be from the middle of June to the end of September, because the birds from those hatchings would commence laying in April, when eggs were dearest. Table birds should be hatched from March to August, in order to be ready for October to Christmas, when they would realise the best prices. In that district, owing to the proximity of the Port Pirie market, which absorbed large quantities of table birds, the general purpose fowl was most profitable. He preferred to secure two or three good breeds, and to permit them to run together, not keeping them shut up, because they thrived better at large. Old stock should be quitted quickly. In commencing, it was well to lay out a few pounds in good birds and breed up. Much of the success of poultry raising depended upon feeding. For egg production, a warm mash should be provided in the morning when the weather was cold, with dry wheat in the evening. For fattening the birds should be kept growing, where they could have a good run and then placed in small pens 6ft. x 4ft., and topped up. They should not be kept too long in the pen, or they would commence to lose weight and depreciate in three days as much

as they had gained in three weeks. Old laying hens which might be tough, if "topped off" in that way, would be much improved. Perches infected with tick should be burned and fresh ones supplied. Examination of the fowls' toes whilst on the roost at night would disclose the presence of the pest. Mr. Flavel preferred the crossbred fowls on the farm, because they were hardier and less subject to disease.

CEREAL GROWING.—To grow grain successfully, remarked Mr. A. Bartrum in a paper on cereal growing, it was absolutely necessary to prepare the ground thoroughly and that was best done by fallowing. Early fallow was best in the hilly country of that district, because it gave the winter rains a better chance to soak into the soil instead of running away to waste. The depth to plough was 4in. to 5in., and the ground should be cross harrowed soon afterwards. The cultivator should be used freely to keep down weeds. For early wheat he preferred Gluyas, King's White and King's Red. For a medium early and general wheat Carmichael's Eclipse and Federation were best, and for late wheat Marshall's Select and Yandilla King. For oats in that district he certainly recommended Algerian, because they were reliable, and gave good returns for grain and hay. Cape oats made better hay than Algerian, but were not so reliable, and had a tendency to go down badly. They were also very much subject to smut. Generally speaking, Cape barley gave the best returns, but it was not always an easy matter to find a market for any quantity. On the other hand, there was nearly always a good market for a good sample of malting barley, of which Duckbill and Chevalier were the best varieties. Barley and oats were best sown on stubble or grass land, and grown on fallow. He advised the three years' system—one year fallow, one in crop, and next year grazing, where the holdings were large enough, but the trouble in that district was that the holdings were too small, and most of them had to go in for one year fallow and the next for crop. Seed wheat should be carefully selected, and should be rust resisting, free from smut, well graded, and pickled at least one month before being sown. Oats should be sown early in May, using 1½bush. of seed per acre and about 1cwt. of super. Barley for grain should not be sown early if a good crop of grain were expected. It required to be grown quickly. For Cape 1½bush. of seed per acre, and for malting 1bush. should be used. Mr. W. Berry considered Federation one of the best wheats for that district. Mr. Flavel said that he always sowed 100lbs. of super. with Gluyas and Marshall's Hybrid as the best varieties of wheat.

MINTARO.

December 9th.—Present: 32 members and five visitors.

VARIOUS METHODS OF HARVESTING.—In harvesting, remarked Mr. R. Garrard in a paper on various methods of harvesting, it should be borne in mind that wheat did not improve after it had ripened, and that the sooner it was in the bags and carted out of the paddock the better. He believed that if it were possible it would pay to have wheat carted as soon as it was in the bags, providing the distance was not too great, say up to five or six miles, and the price of wheat was not below 3s. 4d. per bushel. The gain in weight would be more than enough to pay for carting, and it would then be away from birds and the danger of fire. Other small details worth considering were that the spreading out of bags a few days before use would make them hold more wheat, and make them very much easier to sew, and they would not require so much jumping when being filled. It was not well to be in too great a hurry on a cool or damp morning, because much wheat could be wasted when it was tough. It was not wise to try and reap when the wheat would not break off easily with the hand, but when it was fit not a moment should be wasted. Everything should be ready, the machine in good order, and the nuts, etc., tightened up. There were five methods of harvesting which he knew of, and they were—(1) The reaping machine and winnower, (2) the complete harvester, (3) the reaper thrasher, (4) the binder and header, (5) the binder and thrasher. He dealt with the advantages and disadvantages of each, and expressed a preference for the complete harvester for that district. Mr. R. Kelly did not consider the complete harvester an ideal machine. Mr. H. Schunke believed that the reaping machine and a motor winnower on the co-operative system would be a good harvesting scheme. It would not be necessary to wait until the wheat would thrash, but as soon as it could be got off the straw it could be reaped and kept in heaps until

cleaned. Mr. C. J. H. Wright considered it wiser to cut one-fifth of the crop and thrash it and conserve some of what would be otherwise burnt stubble. Wheat could be stacked and then left in a heap for a year before being threshed, and no barm would come to it. Mr. T. J. Hogan did not favor the binder and thrasher. Hay was too cheap to store, when there was plenty of self-sown to be had for the carting. It was a good plan to have a good stack of straw for a lean year. Mr. A. Lowe said that the farmers in Scotland made as much money out of straw as they did from grain by feeding it to cattle.

HILL TOWN, November 27th.—Mr. A. A. Lehmann delivered an address on ensilage. He referred to the overhead, pit silo, and stack systems of ensilage. In the Riverina district of New South Wales it was customary to take out silo pits with a horse scoop, 20ft. in length, 10ft. in width, and 6ft. in depth, with upright sides and a sloping bottom. Drays with the ensilage were driven into the excavation, and the load spread about. The drays continued driving in over the fodder, until the pit was filled. A horse was kept walking around the edge of the ensilage to ensure the pit being evenly filled. When full, a large portion of the earth taken out of the pit was shovelled on to the ensilage to weight it down and exclude the air. Very little of the fodder was damaged by the soil, especially if the pit were located on high ground. Almost any kind of green fodder and herbage made good ensilage. He had seen good ensilage made from artichokes, and cattle relished it. In the discussion which ensued, the opinion was expressed that a silo such as Mr. Lehmann had described would be a failure in that district, because the ground was too wet. All agreed that ensilage was good fodder for milch cows.

WIRRABARA, November 11th.—Mr. B. C. Joppich read a paper on the care of farm machinery, recommending the selection of machines in accordance with the class of country in which they were to be used. It ruined machinery to work it with loose bolts or nuts. All bearings should be in proper position, and well oiled. When the work of the machine had been completed it should be overhauled, all tension springs released, and placed under cover. The woodwork should receive a coat of paint every two or three years. Machine sheds with stone walls and iron roofs were safest, but were not so cool as straw.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT.)

LONE PINE.

November 7th.—Present: 17 members and seven visitors.

CARE OF THE WORKING HORSE.—Fresh air and healthy sanitary conditions were as necessary for the wellbeing of the horse as for mankind, remarked Mr. Walter Schmaal, in a paper on the care of the working horse. The stable, he continued, was the house of the horse, and it was necessary that it should be clean and sanitary. The floor should have a gradual slope, allowing the wet to run into a channel and drain off outside the stable. Every horse should be cleaned every morning with a currycomb and a hard brush. That promoted cleanliness, stimulated the circulation of the blood, created warmth, and conduced to health. Crushed oats and chaff made excellent food for working horses. Crushed oats were easily digested, and if they and chaff were damped the feed was more palatable and digestible. It was well, after bedding up a horse at night, to give it an armful of hay in a manger. In summer an armful of grass, &c., cooled the blood and kept the horse in condition. A good feed of oats should be given at least once a day, to keep up the heat of the body and enable it to withstand the cold weather. Water should be given at least three times a day. Farmers had to contend with sore shoulders in their horses, the causes of which were badly fitting collars, wet weather, too high or too low hames, and mismanagement of feed. Collars should be exact in their fit, and always used on the same horse. They should be cleaned daily by having the dirt scraped off, but when sores occurred collars should

not be cut. The hames should fit well on the collar to allow an even pull on both sides. Horses with sore shoulders should not be washed after work.—Mr. J. A. Butfield advocated washing round the sores when the shoulders were affected, and the application of oil or ointment. Mr. F. Fromm recommended washing the shoulders of horses harnessed for the first time with vinegar, as it hardened the skin. Mr. E. Minge was averse to feeding horses with sore shoulders with oats, because they were heating, and retarded healing. Mr. T. Lehmann said that oats made little difference to a horse with sore shoulders.

LONE PINE.

December 5th.—Present: 20 members and eight visitors.

MIXED FARMING.—In a paper dealing with mixed farming, Mr. Hilton Schwarz said that a farm with an area of 300 to 600 acres should be divided into three parts, one-third for crop, one-third for feed, and one-third for fallow. He advocated fallowing to a depth of 3in. or 4in., and in the following year the fallow should be worked to a greater depth, but in the third year the working should not be so deep. Oats should be grown to keep the land in heart for wheat crops. A team of nine or 10 horses would be required. Two or three ponies should be kept, and two or three foals raised every year. A flock of 150 or 200 sheep should be kept. Their droppings fertilised the land and increased the crops, enabling the farmer to keep more sheep. That meant more lambs and the greater enrichment of the land. Sheep were quite as profitable, if not more so, than dairying, though the returns were not so quick and regular. At least half a dozen cows should be kept on the farm, and it should be arranged that some should calve in April and some in November, in order to provide a regular source of income. Summer fodder should be grown for the dairy cows. Pigs should be kept, one breeding sow, and four or five pigs for killing. Every farmer should keep from 100 to 120 fowls, and every farm should be equipped with a blacksmith's shop. An outfit costing £20 would provide all that was necessary. By effecting his own repairs a farmer could save from £30 to £40 per annum. Mr. C. Beechmann considered that every farm should contain a few acres of vineyard and orchard. A few geese, ducks, and turkeys should also be kept. Mr. F. Fromm said that 200 sheep could be kept on 600 acres by constant change from grass paddocks to fallow, and thence to stubble paddocks.

MALLALA (Average annual rainfall, 16.88in.).

September 12th.—Present: 10 members.

THE HORSE.—Horses were divided into five definite and distinct classes, which had been well preserved, remarked Mr. T. Weatherill, in a paper on the horse. First there was the hunter, the product of a blood horse and a half-bred mare, a strong animal, capable of undergoing great fatigue; then there was the race-horse, proceeding directly from the mating of an Arabian sire with an English mare, which had been bred by a similar cross. That was called the highest blood. Thirdly, they had the coach horse; fourthly, there was the draught horse; and fifthly, horses of no particular character, the result of accidental crossing among the rest. The roadster, which was used for travelling, was more difficult to obtain in perfection than either the hunter or the racer. It was one of the most useful animals of which the country could boast, and should be produced in greater abundance. The draught horse, for the farmer, was the most important breed of all, and great improvements had been made in it. The staple diet of horses required close attention. Oats and hay should be fed to horses doing heavy work, and bran, linseed, and carrots should be used. Bran was a laxative, and should be given only in the form of a mash at the end of a day's hard work. Carrots carefully cleaned might be given occasionally in small quantities. They maintained the blood in good order, and allayed febrile symptoms induced by the dry fodder, on which horses usually subsisted. Oats should be bruised and given midday and evening. Horses should have access to water at all times, day and night, and a fresh supply should be kept up. In that way horses would drink less than if watered at stated times, and would keep in better condition. In ordinary cases horses should be watered at least four times a day. It was a cardinal rule in horse management that they should be watered before being fed. The contrary practice was liable to produce colic. The reason was simple enough. Water did not remain in the stomach, but merely passed rapidly through it, on its way to

the caecum. If the stomach were full, the water was apt to carry with it from the stomach into the small intestines some of the food before it was prepared for transmission. Undigested food acted on the intestines as a foreign body, and produced irritation. Horses might be watered with safety immediately after work, even though heated. A good grooming down or slight exercise might be advantageous.—Members generally agreed with the views expressed in the paper, and that the horse, being indispensable to the farmer, deserved better treatment than it frequently received.

LYNDOCH, December 7th.—Discussion took place on "The Fruit Prospects for the Coming Season," "Prevalence of Various Diseases," and "Effect of Hail on Fruit Trees and Vines."

WATERVALE, December 9th.—A discussion took place on the cincturing of currant vines, and members generally favored the operation, but considered that it was best to make the ring around young vines without taking out the piece of bark. In older and stronger vines the bark should be removed. The stronger the vine the wider should be the cut. The operation should be carefully performed.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

MINLATON (Average annual rainfall, 17.41in.).

November 10th.—Present: nine members.

HOMESTEAD AND OUTBUILDINGS ON THE FARM.—A paper on the homestead and outbuildings on the farm was read by Mr. R. H. Tilbrook, in the course of which he set out that the first point to decide, after purchasing an unimproved farm, was the selection of a site for the erection of a homestead. That should be built near a main road, and also in a convenient position to work the farm economically. The house should be built of stone, having high walls and plenty of ventilation. Having selected the site for the house, equal thought should be given to laying out the farm outbuildings. They should be placed well away from the house, and always at the back. Assuming that the farm comprised about 1,000 acres, the stable should be big enough to stable at least 16 horses and provide a couple of loose boxes. It should be built of stone, with an iron roof. By placing the stable and chaffhouse under the one roof money would be saved and it would be more convenient. The hay yard should be close behind the stable, and enclosed with a stone wall 4ft. high. The implement sheds and barn should be at least 100yds. away from the stable. It was inadvisable to have all sheds connected, owing to the danger of fire. If the barn were constructed with an entrance at both front and back, with a gable roof, a leanto on either side would provide good implement accommodation, blacksmith shop, &c. It was well to have sliding doors to the implement shed in order that implements might be moved in and out with little trouble. Water for the stock should be handy to the homestead. The gateways should be wide, and made of iron. Good sheep-proof fences should be erected. Trees should be planted around the house, but not near enough to interfere with the garden or underground tanks. Discussion followed, and it was agreed that the homestead should not be too near the road or boundary, and that stone buildings were preferable to any others. In place of one wide gate it was considered more convenient to have a double gate.

WESTERN DISTRICT.

KOONIBBA.

December 7th.—Present: 10 members.

CARE OF HORSES.—In a paper on the care and feeding of horses, Mr. W. Post said that a good, warm stable should be provided, with separate stalls, a neck rope, and a good manger, in order that all horses might get their own feed. Horses

should not be permitted to run loose in the yard. Some of the horses would get most of the feed, and proper work could not be expected from a horse which did not get sufficient feed. Horses should be fed with judgment, and at right times, because it was not always the quantity of feed which fattened the horse, but the regular feeding and watering. Horses should not be turned out over night at seeding time, unless there was abundance of feed in the paddock. They could not do a day's work if they were walking the paddocks all night looking for feed. If kept in at night they should not be given more feed than they could clean up by 12 or 1 o'clock. For the remainder of the night they should rest. He preferred hay as feed at night. Young stock or idle horses should not be driven from the yards when the workers were being fed, but they should have a little feed also. Hoofs should not be permitted to grow too long, because that often caused lameness and soreness. Nor should they grow too bare before shoes were put on. Should that happen, however, the nails should not be driven too tightly, or a piece of leather should be inserted between the hoof and the shoe. The back of the shoe should have a little spring in it, or corns might be caused. Stockholm tar applied to the hoofs tended to prevent cracking. On no account should a collar be changed from one horse to another. Members agreed that half to three-quarters of a ton was sufficient load for a horse on the roads in that district. It was agreed that fair treatment, good feeding, and good driving were the essentials in obtaining a staunch team.

YADNARIE (Average annual rainfall, 14.09in.).

December 9th.—Present: 10 members.

QUALIFICATIONS OF A FARMER.—The farmer's calling, declared a member, in a paper dealing with the qualifications of a farmer, was one of the most honorable, useful and difficult. The farmer required to be a good judge of land and have the ability to determine how to work the various classes of soil on his property. With judicious tillage and discrimination in the uses of fertilisers and the selection of crops, even poor land might be made to produce profitable returns, but injudicious treatment of the same land might easily prove ruinous. He regretted that ploughing matches had gone out of fashion, because good ploughing was not only satisfactory to look at, but was also a factor in successful cultivation. If the land were properly turned with the plough it was better for the rest of the farm machines, which necessarily followed right up until the harvest was completed. Bad ploughing, with high crowns and corresponding hollows was just the reverse. With such land, the seed in the hollows was likely to be injured by too much moisture, and the plant on the ridges suffered from excessive evaporation. Ploughing matches were as important as stock shows, and deserved more consideration at the hands of those interested in agricultural pursuits. There had been great progress of late years in labor-saving agricultural implements; and an up-to-date farmer had to make good use of his brains before becoming expert with them all, because many of them were very complicated. In dairying—a most important branch of farm work—the farmer required to be skilled, observant, and painstaking. The selection and breeding of stock, the feed and treatment of the cows, and the handling of the dairy products, all required sound judgment and much knowledge. In that connection the necessity for scrupulous cleanliness in connection with all dairy work should be emphasized. That also applied to the treatment of pigs and poultry, and, as a matter of fact, to the land, because it was advisable to keep the land as free from weeds, &c., as possible. The farmer who possessed much stock also required a fair knowledge of the symptoms and treatment of the more common complaints to which they were subject, because at times it was impossible for him to obtain the assistance of a veterinary surgeon. The farmer should also possess integrity and industry. He required to be methodical, and attend to his duties throughout the year. If he did that he would get through an immense amount of work with satisfaction to himself, and without feeling tired and overworked. On the other hand, if he permitted work to be put aside, he would find that he could not recover lost time, except by rushing and scamping his work. Many farmers disregarded social obligations, but it was a mistake, because a man who practically cut himself off from his fellow-man was not a good nor desirable citizen. A farmer's avocation required brains and intelligence, and the necessity for education was therefore apparent, but was frequently

neglected by the rural community. The more knowledge a farmer possessed the better were his chances of success. Mr. J. J. Deer considered that it was essential for a farmer to be not only master of one branch of the business but of all. Education was important, because the farmer was a commercial man, and it was requisite that he should keep a diary as a guide from one year to another. An uneducated farmer was under great disabilities. Mr. W. L. Brown was of opinion that bookkeeping was necessary for successful farming. Mr. E. C. Kruger affirmed that the facilities for education of the children of outback settlers should be further extended. Mr. W. Jericho observed that the man of no education was in his right place on the land. He would not expect a man with a college education to become an ideal farmer. Mr. W. F. Banks urged the advantages of education, but said that he knew sheep farmers, who had practically no education, who were successful. Mr. A. A. Dreckow said that education was necessary for all trades and callings, but the child should be educated for the walk in life which it was anxious to follow. Mr. S. H. Kruger considered the suggestion of a diary a very good one.

GOODE, October 9th.—Mr. E. S. Stephenson read a paper on profitable side lines, urging that sheep, cattle, pigs, poultry, and vegetables should be grown on every farm. In that district, farmers were at a disadvantage in that there were no reliable markets for their produce. Once the local demands had been supplied, there was no outlet for their products. Mr. W. Folland suggested the crediting of butter, eggs, pork, &c., against groceries, vegetables, and fruit, and they would find that the credit side preponderated. Mr. W. G. Morcombe said that fowls were profitable, but he was averse to crossing.

KOPPIO, December 12th.—Mr. T. Brennand, in a paper on the care of agricultural implements, said that the best time to effect repairs and alterations was when the machinery and implements were not in use. The blacksmith could do the work much better if given reasonable time, instead of being rushed. Painting woodwork was the best preservative yet discovered, and was not merely for appearance sake. Even a coat of linseed oil applied to wheels was beneficial in the same way as grease or oils improved harness. In the discussion which took place, members agreed with the views expressed in the paper, and considered that machinery should be overhauled as soon as it had finished work for the season. Failing that, a note should be made of repairs required in order that they might not be overlooked.

MINNIPA, November 25th.—Mr. L. J. Cook delivered a short address, taking as a subject, "Why We Till the Soil."

MOUNT HOPE, November 17th.—A paper was read by Mr. W. Mahoney on hay-making, in which he advocated a careful overhaul of the binder and all its parts and appliances and the necessary supply of oil and binder twine before commencing operations. By inserting the handle in its place, the whole of the mechanism should be easily set in motion with one hand. If there were any difficulty it would probably be with the knives. All the blades should be sharp and in good order, or the draught would be much heavier and cause unnecessary wear on chains and sprockets. In working the binder the reel should be adjusted so that the crop would fall naturally on the elevator. Sheaves should be moderate in size and be tied about one-third of the length from the butt. He preferred hay somewhat on the matured side. It should be stooked immediately after the binder, and stooks should be round and comprise 30 or 40 sheaves. The heads of the sheaves should be close together, with the butts outward, at a slight angle, which rendered them safe against wind or rain. Mr. R. Myers would cut the crop on the ripe side, especially oats. Mr. T. Speed preferred green hay, even if necessary to add grain. Mr. T. Myers would not put too many sheaves in a round stook, because of the danger of the hay becoming musty.

WARROW, November 25th.—Mr. J. G. Cowan read a short paper on the feeding and care of horses, in which he advocated the provision of a good, warm stable, because warmth was half the battle in feeding. A useful ration for, say, nine horses, would be at night when brought home from work a kerosine tin of whole oats, and the same amount of crushed oats, with two bags of chaff. If hay chaff were not available, cocky chaff would do. Two sheaves of long hay should be fed

to each horse for the night. Horses did better on long hay than chaff if given time to eat it. Stables should be kept clean, and there should always be a plentiful supply of clean water. In the discussion which ensued members generally agreed with the views expressed in the paper, except that they preferred short feed instead of long hay.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

KI KI.

December 9th.—Present: nine members.

SUITABLE FARM SHEEP.—In face of the fact that sheep are realising record prices and the high rates ruling for fencing material, every farmer, remarked Mr. H. Redman in a paper on the importance of sheep on the farm, and types suitable for the district, should keep a few sheep, no matter how few he commenced with. It was better to begin with too few than too many. The class of sheep he recommended was strong-woolled Merinos, with short legs, big girth, ribs well sprung, and carrying a deep, shafty fleece with plenty of character. That type of sheep had a good constitution, was a good doer, cut a good fleece, and when past its prime in wool production, provided a good carcass to fatten for the butcher. If the fat lamb industry were preferred, the Southdown or Shropshire should be crossed with the Merino. They matured very quickly, were good mothers, and prolific breeders. If wool and carcass production were desired the Leicester-Merino cross was an excellent one. The Romney Marsh-Merino cross also did well in wet districts, they resisted foot rot and fluke, and were prolific breeders. Having decided on the class of sheep to be bred, some aged ewes should be secured from a well-founded flock of good repute. He perferred the aged ewes to two-tooths, which were mostly culls. Good strong, robust rams should be secured. Thoroughness in every detail was imperative in the management of sheep. He advised the breeching of the sheep before the green feed arrived, because it avoided the soiling of the wool, and removed a harbor for flies. Sheep so treated, especially if immediately sprayed with dip, were rarely attacked by flies. All sheep should be regularly dipped every year, with powder dip, within a month or six weeks after shearing, when the wool would be long enough to absorb and retain sufficient of the dip to prove effective during the year. Abundance of feed and water were essential, and it was wise to provide a trough of bonemeal. The sheep might not take to it at first, but they would soon clear out the trough. In killing and dressing the carcass should be completely stripped, because every extra pound of wool increased the value of the skin. Great care should be taken to prevent the blood staining the neck of the fleece. Unless sheep were skinned immediately after being killed blood would collect in the veins and stain the pelt. The hand should be used more than the knife, to avoid cutting the skin, which should be dried in the shade and washed with arsenic to ward off weevils and flies. When thoroughly dried (not before) the skins should be packed for market.

KINGSTON-ON-MURRAY.

December 15th.—Present: 14 members and five visitors.

FRUIT GROWING.—An address on fruit growing generally was delivered by Mr. G. W. Beverley, of Pyap Estate. In the first place, he advised good, deep ploughing, and a crop of some sort should be sown, if possible barley, to sweeten the soil and prevent young trees or vines making too vigorous growth. In selecting nursery stock care should be taken that the parent stock was well matured, and was a good cropper, because in the majority of cases the offspring followed the characteristics of the parent stock. In rooted vine cutting only one cutting should be taken from the rod, and that close to the end severed from the vine. He preferred the square system of planting, especially with vines, because all trellis posts could be brought into line without danger of clashing with vines in any row. A fair distance for planting fruit trees was 20ft. x 20ft., and for vines (currants,

sultanas, and Gordos), 8ft. x 12ft. Lime applied to the soil was a valuable factor in releasing plant food, and was also a sweetening agent. In cincturing currants a broad incision ¼in. was advised in order to ensure a complete severance of the bark. Sultanas should be cinctured when the fruit was set. Oranges gave good results by girdling, which might be effected by placing a piece of tin around the trunk and then twisting wire as tightly as possible around it. The tin prevented the wire from cutting into the bark. The wire should be left in position until the fruit was well set.

McNAMARA BORE.

November 11th.—Present: six members.

CLEARING BURNED MALLEE SCRUB.—The cheapest and easiest method of clearing burned mallee scrub four or five years old, ready for cropping, observed Mr. T. E. Bennier in a paper on clearing mallee scrub, was to obtain a log 20ft. in length and 8in. in diameter and hitch to it two horses, tandem fashion, in order that they might be driven through the mallee without any trouble. The logging down should be carried out in the same direction as it was intended to plough. The ploughing should be done with an eight or 10-furrow disc. Anything likely to stake the horses should be removed by hand. A fair amount of draught was required on the disc in order that the horses might work more evenly. The discing should be about 3in. deep in order to turn the ground over. The work should be done in July or August, whilst the ground was wet. A fair amount of draught would remove about two-thirds of the shoots, and, in the following October, he would harrow with a heavy set of harrows, driven in an opposite direction to the ploughing in order to tear off a few more shoots. The slasher should be put to work in January. A double row fire rake could be used in February, in order to carry fire all over the ground, sweeten the soil, and kill the rubbish. After the fire rake the harrows should be used, and then about half a bushel of wheat drilled in straight, with about 56lbs. of high grade super. A mid-season wheat should be sown. Whatever small sticks were on the ground would be caught the following year with the fire rake, and after that a share plough could be used with ease. Mr. W. Paterson would rake before harrowing, because the rake pulled off more shoots. He also recommended using a shutter or door fixed to the axle of the stripper, because it flattened down the stubble, and made a better burn. In answer to a question Mr. Bennier said that he would plough with a share plough without logging where the burnt mallee was small.

NETHERTON.

November 18th.—Present: six members.

SUBDIVIDING THE FARM.—In a paper on subdividing the farm Mr. E. Brown recommended commencing clearing in a corner and gradually working along the boundary. Paddocks should be about 100 acres in area, otherwise much time would be wasted in mustering stock. In fencing, the straining posts should be about five chains apart, and if ordinary posts were not available, T iron standards, 4ft. 8in. in height, should be used. They should be driven 1ft. into the ground, and be 9ft. or 10ft. apart. Three barbed wires should be used, 1ft. apart, the topmost being on the cap of the post. Such a fence should restrain ordinary great stock, and to make it sheep proof it would be necessary only to add two plain wires, the first placed 8in. below the lowest barbed wire, and the other one 7in. lower down than that. The wire should be strained on a hot day, being then less liable to break in straining, and likely to keep in order much longer. Members generally agreed with the views expressed in the paper. Mr. C. Wilson said that straining posts should be 10 chains apart, because wires were maintained more tightly in long strains. Wooden posts should be put in every chain with iron standards between. Two barbs were sufficient in a fence to retain great stock.

POMPOOTA.

November 23rd.—Present: 30 members and two visitors.

GARDENING ON SWAMP LAND.—In preparing swamp land for growing vegetables, declared Mr. O'Callaghan, in a paper on gardening on swamp land, it should be ploughed deeply, then harrowed well to break up clots and ensure a firm bottom, rolled in the same direction as the furrows, and again harrowed until the

soil was reduced to a fine tilth. Any variety of vegetables would grow on the Murray swamps, which were naturally rich in humus, but might need a dressing of potash and nitrogen fertilisers. Green manuring was one of the best methods of fertilising and improving land exhausted by continuous cropping, and where stable manure was not easily obtainable. No plant was so good as the pea for that purpose. In warm climates the cow pea was, without doubt, the best plant for green manuring. Planted when the ground was warm, they soon yielded an enormous crop of green stuff, which was of very high manurial value when rotted and incorporated in the soil. Concentrated and powerful manures should never, in a fresh state, come into contact with seed or the roots of young plants. The first considerations were the proper time and manner of sowing, and securing good seed. It was poor economy to buy cheap seed, which might not germinate, and if it did grow, produced mixed varieties. Sowing should be in drills, of the greatest length the garden would permit. The work of thinning and hoeing might then be carried out more conveniently. In most cases, when seeds did not grow, the fault was with the sowers, who did not know the proper time to sow different kinds of seeds. In sowing seeds, common sense should be exercised. Whilst many kinds of vegetable seeds, such as onions, peas, &c., could be sown with safety as early in spring as the ground could be prepared, other kinds would perish entirely. It was common to see crops of roots for winter use running to seed through being sown too early, and other vegetables coming in faster than they could be used or sold, with none to succeed them. To overcome those mistakes the beginner should keep a minute account of his work as a guide for future proceedings. A garden site should be a well-drained piece of land, because vegetables would not grow on sour or ill-drained ground. When irrigating, all the plants should be given a thorough soaking once or twice a fortnight. It did more harm than good to be always sprinkling the top surface, because the roots of all plants would be merely on the surface instead of going deep into the soil. To secure the best results in the vegetable garden, it was necessary that different kinds of crops should follow each other. Under no circumstances should cabbage follow cauliflower, or carrots succeed parsnips. Each crop should be as dissimilar as possible from its predecessor. The variety of vegetables to be grown would be controlled by the distance from market and the means of transportation. For those far distant from a railway, potatoes and onions would be the most profitable crops.

RAMCO.

November 6th.—Present: eight members.

THINGS WHICH PAY ON A BLOCK.—There were many differences of opinion as to the cost of various operations on a block, remarked Mr. T. Lewis, in a paper entitled "Things which pay on a block," and it was well to have the exact facts and figures for examination. The subjects he had chosen for demonstration were as follows:—(1) Two-horse versus one-horse ploughs; (2) two-horse versus one-horse cultivators; (3) horse hoeing versus hand hoeing; (4) selling fresh versus selling dried fruit; and (5) distillery versus drying lexias. In calculating the expenses in connection with those matters he had put labor down at 9s. per day and horse hire at 2s. 6d. per day. The orchard worked was taken to be 15 acres. The figures worked out as follow:—Table I.—Single-furrow plough versus two-horse double-furrow plough—Cost of single-furrow plough, £3 10s.; interest on capital (7 per cent.), 5s.; depreciation (10 per cent.), 7s.; ploughing 15 acres twice, £15; total, £15 12s. Cost of double-furrow plough, £10; interest on capital (7 per cent.) and depreciation, £1 4s.; ploughing 15 acres twice, £9; total, £10 4s. Balance in favor of two-horse plough, £5 8s. The single-furrow plough did better work as a rule in the orchard, especially in old ground. Table II.—One-horse cultivator versus two-horse cultivator—Cost of one-horse cultivator, £2 10s.; interest and depreciation, 8s. 6d.; furrowing out 15 acres five times at 2s., £7 10s.; cultivating in 15 acres five times at 2s. extra, £11 5s.; total £19 3s. 6d. Cost with extra parts of two-horse cultivator, £20; interest and depreciation, £3 8s.; furrowing out 15 acres five times at 1s. 2d., £4 7s. 6d.; cultivating in 15 acres five times at 1s. 2d., £4 7s. 6d.; total £12 3s. Balance in favor of two-horse cultivator, £7 0s. 6d. The two-horse machine did better work as a rule because it was more rigid and had not the same tendency to run round large weeds. He had put the cost of cultivating for one horse to even the work done with the large machine, because it cultivated right across between the furrows in one operation, whereas it took

more with the smaller machine. Table III.—Horse-hoeing versus hand-hoeing—Cost of a horse-hoeing machine, £5; interest and depreciation, 17s.; horse-hoeing 15 acres at 2s., £1 10s.; finishing by hand at 3s., £2 5s.; total, £4 12s. Hand-hoeing 15 acres at 10s., £7 10s.; total, £7 10s. Balance in favor of the machine, £2 18s. The machine made a far cleaner job, because it shifted the weeds bodily, including roots, and it was noticeable that when the machine had been used, there were always fewer weeds the following year. Table IV.—Fresh apricots versus dried apricots, 1916 prices (six tons fresh fruit equals 1 ton dried fruit)—Six tons fresh fruit at £12 per ton, £72; less picking and handling, £6; net total, £66. One ton dried apricots, £85 13s. 4d.; less picking, handling, £6 13s. 4d.; cutting, £6 13s. 4d.; interest and depreciation, £3; sulphur, 5s., equals £16 11s. 8d.; net total £69 1s. 8d. Balance in favor of dried apricots, £3 1s. 8d. The cost of cutting was based on 2d. per 3ft. x 2ft. tray, which, in his opinion, was not sufficient. Cost of picking £1 per ton was simply an estimate, because he could find no figures for a basis. Table V.—Distillery proportion of lexia crop. Gross value of one ton of lexias in bags, £38.—Fresh lexias versus dried lexias.—Fresh—3½ tons fresh fruit at £5 2s. 6d. per ton at 14 Beaume, £17 18s. 9d.; less picking and carting, £3 10s.; net total, £14 8s. 9d. Dried—One ton in bags, £38; less picking and handling, £3 10s.; interest and depreciation of plant, £1 16s.; bagging, £1; freights, £1 10s.; brokerage, £1 18s., making £9 14s.; net total, £28 6s. Balance in favor of dried, £13 17s. 3d. Animated discussion followed, and members were practically unanimous in agreeing with the writer as to implements. Mr. Stanley pointed out that where two horses and larger implements were employed the work was completed so much more quickly that the saving in time, which he could utilise on other work soon paid for the machinery. In table IV. (apricots) Mr. Stanley said that he would sell fresh in spite of the slight advantage on the dried fruit, because a lot of worry was avoided, and the returns were received earlier, and he thought the trees were better, because there was less sugar taken. In Table V. (distillery proportion), Mr. J. J. Odgers pointed out that the writer had taken the value of dried at an exceptional season, for £38 per ton in bags was an abnormal figure. The usual custom was for the local executive of the Dried Fruits Association to fix a minimum price at which fresh fruit sold could count as export. Last year it was fixed at £4 10s. per ton 15 Beaume, and was calculated on the preceding year's dried price of £22 per ton.

BERRI, December 7th.—Mr. H. E. Laffer (the Viticultural Instructor) delivered an address dealing principally with the vine and the effect of various fertilisers upon it and upon its fruit.

BRINKLEY, November 7th.—A homestead meeting was held at Messrs. Pearson Brothers' farm. An inspection was made of the crops, of which about 300 acres of well-worked fallow, sown after the rain, showed to the best advantage. About 12 acres of lucerne, sown in the driest season on record, had germinated well and become firmly rooted, promising good crops of green feed in the summer.

COONALPYN, October 6th.—Mr. W. J. Spafford (Superintendent of Experimental Work) delivered an address, and said that in that district, with such good soil and a good local rainfall, crops up to 30bush. of wheat might be expected when the land had been cleared and well worked. He had been most impressed with the need for cultivation. At least three cultivations were required between the fallowing in, say, July, and the seeding in April. If lack of time prevented such treatment of say 300 acres, then he was confident that it would prove profitable eventually to crop only an area which could be treated in that way, even if it were only 200 acres. The best time for seeding in that district was from the middle of April to the end of May and the depth of sowing should be from 1in. to 1½in. Barootа Wonder, Red Russian, and Lotts might be the most suitable varieties to sow. The swampy patches noticeable through the district would disappear after a heavy dressing of lime. In answer to a question, Mr. Spafford said that mallee shoots were always most difficult to kill where the rainfall was good. In drier areas they succumbed much more readily to fire. He was averse to cropping the sandy land if plenty of the stiffer clay flat lands were available.

FORSTER, October 21st.—A paper entitled, "Never buy what you can grow on your own farm," was read by Mr. James Searle, in which he urged that it was cheaper for a farmer to produce for himself than to pay others to produce for him.

Farmers should grow their own fruit and vegetables. Calves should not be killed, but should be kept until two or three years old, when they supplied beef. Poultry should also be raised on the farm to supply eggs and food.—Mr. C. Payne advocated the conservation of fodder by cutting portion of the crop in the yellow stage and threshing or heading. The headed straw paid for the extra trouble, being two-thirds the value of hay. Mr. G. Evans considered that the rough state of the country was against binding, because stumps were high and crops frequently on the low side.

GERANIUM, November 4th.—Mr. F. Norton read a paper on bookkeeping on the farm, in which he pointed out that farmers would save themselves considerable time and trouble in their general business, and specially in compiling their taxation returns, if they kept books. He suggested keeping a diary for recording each day's work, the quantity of seed and super. sown, when sown, and under what conditions and also a record book in which to keep results, and any other information which might prove useful. For the financial part of the business a cash book, ledger, and petty cash book were necessary. The cash book should correspond with the bank pass book, and should show all money paid into or drawn from the bank. The ledger showed all the accounts, including the amounts expended on wages, repairs, cornsacks, &c., &c. The petty cash book would show the small amounts paid in cash. With these simple books a farmer could always determine what his position was.

MONARTO SOUTH, December 9th.—A paper by Mr. G. A. Hartmann was read on what area to sow to make farming pay. He maintained that 250 acres should be put under crop every year to make farming pay. In the mallee country, where the quality of the soil was poor, more wheat would require to be sown. If the crops averaged 9bush. or 10bush., which would be 830 bags, and the price of wheat 3s. 9d. per bushel, that would leave the farmer only 3s. per bushel, because carriage, commission, and bags amounted to between 9d. and 10d. per bushel. That left but a small balance of profit. Therefore, in the future, the area would require to be increased or more cattle, sheep, pigs, and poultry kept. In the discussion which ensued, the opinion was expressed that if good water could be secured in that district and more dairying and pig raising carried on, the writer of the paper could be agreed with. As regards boring for water, many thought that it would be too expensive in that district owing to the hardness of the rock. One member said he would not object to the expense if he were assured of a supply, because then he would grow lucerne.

MORGAN, November 11th.—A paper was read by Mr. W. G. F. Plummer on the size of irrigation blocks, in which he contended that for a block to be used partly for fruit culture and partly for dairying and other purposes, 15 acres were ample. Of that area, 10 acres could be used for trees and five acres for raising fodder for cows, pigs, fowls, &c. A block of five acres which was planted with lucerne had maintained 22 head of milkers besides a number of young stock. In addition a small stack of lucerne hay had been provided.

SOUTH AND HILLS DISTRICT.

BLACKHEATH.

December 9th.—Present: 12 members and six visitors.

HARVESTING.—Discussing the work of harvesting in an interesting paper, Mr. H. G. Pym said that the most observant farmers would watch their crops from stage to stage until, in their opinion it was at its best and then lose no time in cutting and stooking it. Most of the hay nowadays, was cut with the binder, which was the most economical method of dealing with it. The clipper was also extensively used in rough ground, where a binder could not be worked with advantage. Loose hay was preferable for feeding long, although the extra work involved in raking, cocking, and carting it on a windy day was a strong argument for the binder. As regards the best time to cut hay there was considerable difference

of opinion. Oaten hay required to be left a while longer than wheaten before cutting. If left until it commenced to turn brown it would be about right. If cut before that it would have a bitter taste, and stock would not eat it too readily. The hay having been cut required to be carted and stacked. Loose hay could be carted within a few days of cutting, and sheaves in about 12 or 14 days, if the weather had been suitable. The farmer often had to face the difficulty of having hay ready to cart and wheat ripe enough to strip. In that case he would attend at once to the stripping, because the crop involved the greater risk. Hay properly stooked would withstand much rain and storms without great damage. To gather in the grain there were several different methods. In hilly or sandy country the most convenient method of dealing with the wheat crop was by means of the stripper and winnower. It was also an advantage to clean up behind the stripper, if sufficient labor were procurable, because by that means the loss often caused through heaping on a loose floor, or by heavy rain, would be minimised. Where the country was suitable the complete harvester had an advantage over the stripper and winnower, because everything was done in the one operation, thus doing away with extra hands, which were not easily procured under present conditions. It should be the object of every farmer to produce a sample of wheat for market better than his neighbor, and not be satisfied with anything so long as the bags were full, because, in the long run that system would not pay. Mr. J. Pym raised the question whether it was better to hire labor and clean the wheat up at once or put it in heaps. Members generally favored the latter view. Mr. H. Paech suggested putting chaff under the wheat heaps to protect them from the damp ground.

CYGNET RIVER.

December 7th.—Present: 10 members and 20 visitors.

CROP EXHIBITS.—No paper was read at the meeting, but the members exhibited samples of their crops and related the conditions under which they were grown. Mr. H. T. Noske exhibited three samples of Prior malting barley. No. 1 sample was 6in. higher than No. 2 although sown on the same day, and both received 1cwt. of super. per acre. Both samples were sown on land which had been ploughed twice, but No. 1 had been cultivated just before sowing with a spring-tooth cultivator, to which was attributed the extra growth. No. 1 would, it was estimated, yield 10 bags per acre, and No. 2 only 8, so that from this it would pay handsomely to cultivate just before drilling. No. 3 had been sown on land which had been ploughed twice. It was fully three parts smut, and would, it was estimated, yield only two or three bags per acre. Mr. C. T. Miller exhibited a sample of Prior barley, sown on August 28, with 1cwt. of guano super. on heavy yellow clay land, which had been ploughed twice and then cultivated. The harrows followed every operation, and the resultant crop was estimated to yield 10 bags to the acre. On land which had been ploughed twice, but not cultivated, the grass and rubbish almost choked the crop. Experiments with mineral super., bone super., and guano super., taking into consideration the cost of the super., and the returns from each plot, were in favor of guano super. Mr. R. Loader showed a splendid sample of Russian rye, which, he said, should be sown very thinly, or otherwise it would not yield a payable crop. Sown thinly it yielded heavily, and as it carried a lot of straw, it was suitable for those who wanted a good burn off after the harvest to destroy the shoots. Some really good samples of Cape or six-row barley, planted under similar conditions to the malting varieties, were also shown. Mr. F. J. Wakelin exhibited some red beet, carrots, and swedes. There was also a good display of cabbages and onions.

INMAN VALLEY (Average annual rainfall, 26in. to 27in.).

December 7th.—Present: 10 members.

SHEEP FOR PROFIT.—Discussing the breeding of sheep, Mr. H. T. Martin, in an interesting paper, advocated breeding in numbers somewhat under the land's carrying capacity, the Lincoln-Merino cross ewe, or the comeback to the Merino or Lincoln. Each of the three classes was eagerly sought after, and commanded the highest rates from buyers in fat lamb producing districts, either as weaners or breeders. That month flock ewes had realised £2 2s. 6d. per head, and first-

cross two-tooths 35s., which was quite 7s. more than butcher's value. Fat values were not proportionately equal to store values, therefore he recommended catering for the store market. There were always buyers for the right sort of stores in the paddocks, without paying rail fares, market dues, and untrucking charges, and very often without commission. If the right sheep were bred, good buyers would soon find them out, without paying an intermediary 1s. 6d. or 2s. per head. Ewes and lambs should be of the very best wool-producing strains. Rams of mutton breeds should not be used on ewes that were to produce ewes for future breeding. Wool realised 1s. 6d. per lb., whilst the carcass sold for 6d. per lb. The carcass was sold once, but a sheep yielded several clips of wool. Ewe lambs should be held until two-tooth, if there were room, without robbing the breeding ewes. That year he had sold his two tooth wethers off the shears, at 28s. 6d. each, and he baled 9lbs. of wool from each of them. Nearly half of them were Christmas lambs, only 10 months old. He could have got 35s. each for the ewes. The return from an average ewe at the present time at a low estimate of weight and price of wool was as follows:—Average wool (8lbs., at 1s. 6d.), 12s.; lamb (4lbs. wool at 10d.), 3s. 4d.; hoggets, wool (9lbs. at 1s. 6d.), 13s. 6d.; sale of hogget (average E. and W.), 30s.; total, £2 18s. 10d. He had accounted for two clips of the lamb, but one was for a lamb with only four or five months' growth. He deducted that amount, 3s. 4d., for the 12 months' expenditure per ewe, which left the handsome profit of £2 15s. 6d. per ewe, and the ewe still left to breed again. He was not absolutely opposed to dealing, because it was beneficial as a stock education, and kept one in touch with values, but the dealing should be done with the surplus grass. He did not advocate the production of fat lambs, because farmers did not cultivate fodder sufficiently, and the hard root grass, which was so plentiful in that district, was more suitable for raising store sheep. To produce prime lambs, without cultivation in that district it would be necessary to stock very lightly in order that there might be sufficient clover and soft grasses to force them on, but then the long, coarse and rough grasses would be wasted.

MEADOWS SOUTH (Average annual rainfall, 35.52in.).

October 11th.—Present: eight members and one visitor.

CULTIVATION OF RAPE.—Giving his experiences in the cultivation of rape, Mr. W. Nicolle, in an interesting paper, said that land for rape should be ploughed in summer or early in autumn and worked down finely before the seed was planted. On March 10th, 1915, he drilled one paddock of 4½ acres of good land with a third crop (rape following peas and oats). He sowed 9lbs. of rape, 2lbs. of mustard, and 1cwt. of bone super. to the acre. The seed was well mixed with the manure, and drilled. The drill was worked shallow, and the rubbers on the drill were taken out of their right position and tied back, a light cord being stretched across the drill, and the rubbers fastened to it in order to allow the seed and manure to drop behind the drill to avoid going too deeply, and to scatter the seed more effectively. If it were calm weather when drilling, the rubbers could be taken off the drill, and the seed and manure could drop direct from the drill. After drilling it should be harrowed and rolled. To that paddock about 20 or 25 acres of grazing land were attached in order that sheep might graze on it, as well as on the rape. Another paddock of 12½ acres was sown on March 18th, 1915, but the land was poor. It was a second crop (rape following a crop of peas). That paddock was worked and drilled in the same manner as the above-mentioned paddock, with the addition of 40lbs. of oats to the acre, the oats not being mixed with the manure. To that paddock about 15 acres of grazing land were attached for sheep to graze on, as well as the rape. That was necessary in order to obtain the best results from the crops sown. The crops grew very quickly. On May 26th, 100 sheep were put on the 4½ acre paddock, and on June 4th 50 sheep were put on the 12½ acre paddock. The sheep did remarkably well. On July 26th 30 fats were sold, and on August 3rd 96 more were disposed of in prime condition, leaving 24 on the rape. Those were also sold fat, with the addition of 9 others which were put with them on August 5th. On August 25th 71 ewes and 70 large lambs were put on the rye, and remained there until October 7th. They were then taken off and the rape paddocks rested until November 1st. The rape ran to seed, but the sheep ate it readily and did well. On November 3rd 51 fat lambs were sold, and on December 14th 71 prime ewes and 19 lambs—those ewes and lambs did not derive as much

benefit from the rape as the previously-mentioned sheep did. On November 1st 124 sheep were put on the 4½ acre paddock, and 30 on the 12½ acre paddock. On November 16th 124 sheep were shifted on to the 12½ acres and 30 on to the 4½ acre paddock, and left there until November 24th, when they were removed and a fresh lot of 26 ewes and lambs put on. The cultivation paddocks were almost done by that time, but a little feed was got through the summer and autumn, until the land was cultivated again in the ensuing season. For the six months 454 sheep were grazed at different times, without counting the last-mentioned lot of 26 ewes and lambs. Discussion ensued, and members generally stated that they had not been able to make a success of growing rape. It was a difficult matter to secure a good plant.

MEADOWS SOUTH (Average annual rainfall, 35.52in.).

December 6th.—Present: nine members and one visitor.

Pruning Fruit Trees and Other Orchard Work.—Pruning required to be done when the tree was young, remarked Mr. G. T. Griggs, in a paper on pruning fruit trees and other orchard work. It was necessary, he continued, to cut the tree back, in order to develop sufficient strength in the stem and branches to sustain the weight of fruit as it grew. The tree should be evenly balanced. There should only be three or four branches to begin with, the tree being kept open, and the young shoots, where too thick, cut out. Some of them might be cut back to form fruit spurs, an operation which could be performed during the summer. If the trees were permitted to develop for 10 or 20 years, and then large limbs were removed, the trees would probably be ruined. If the wounds so made did not heal up, dry rot would ensue. By checking the growth the fruit was formed on the strong branches, and the effects of the wind were minimised. Nearly all fruit trees needed to be cut back, and the limbs of the fig tree needed cutting back, with the result that several branches would grow out of the ones cut off. By cutting back some limbs of cherry trees, fruit buds were forced out on the lower part of the branch, and by cutting back the outside limbs of old plum trees new shoots were forced out farther back, and that was where the best of the young wood was secured the following season. With regard to manure, he preferred gypsum. He placed it around the trees and scattered it about. It improved the quality of the fruit and the growth of the trees. When pruning or grafting old trees, sufficient small wood should be left to keep the sun from burning the bark on any of the branches. If the sap were not sufficiently fast in its flow, the sun would burn the bark, and it would die on the upper side. To avoid that, he had tied bagging over it to protect it until the foliage came. All weeds should be kept down, and some sheep might be kept in the orchard, to assist in repelling codlin moth; the sheep, however, would destroy the low branches, and the fruit returns would be impaired. In storing fruit, more especially apples, if an excavation were made in a hillside, and the fruit covered and kept dry, the result would be satisfactory. A Jonathan apple had been found in November which had been ploughed under the furrows. It was quite sound and crisp. In reply to questions, Mr. Griggs said that fruit would keep best in a cool, dry place, not exposed to the wind. He demonstrated the method of budding, and said that he preferred it to grafting. He advocated the use of lime, because it made the soil more friable.

MILANG.

November 11th.—Present: 33 members.

Pigs.—After dealing with the history of the animal, Mr. William Saltmarsh, in a paper on pigs, recommended first that they should be fed, when growing, three times per day, unless running in good green feed or stubbles, when, in the latter case, good slops should be provided, and in the former case, some corn. If provided with good food and a good dry bed, they would sleep all night and be ready to forage all day, and mature rapidly if required for bacon. If, on the other hand, the object was pork, a different plan should be adopted. The animals should be weaned at six or seven weeks, put straight into the fattening pens, and fed liberally on the best feed obtainable. If there was an engine on the farm, there

should certainly be a crusher also, and all corn should be thoroughly crushed, and in the case of feeding to young pigs, should be thoroughly soaked in milk. Wheat was undoubtedly the best grain, and the finer it was ground the better it would be, being easier of assimilation than whole or roughly crushed corn. Peas, barley, oats, and rye were all valuable, and might be given for variety. Where corn was not grown, pollard, when of reasonable price, could be used to advantage. He did not recommend any particular breed. His experience as a breeder had been confined to Berkshires, and he was satisfied with it as an all-round animal; but whatever breed was adopted, a pure hog should be secured. Berkshires were represented all over the State, and would therefore be easier to keep up to the standard than any other breed. In choosing a sow to breed from the teats should be examined. The more she had the better. A young sow might be bred from. It had been proved that a sow put to the hog at five months old had been highly productive up to seven or eight years of age, starting with a litter of eight, and at maturity producing 14 pigs, and her growth at the same time had not been interfered with. Under a starvation diet, advocated by some breeders, the sow would be stunted in growth. Sows should be allowed plenty of exercise, and small pig-proof enclosures a few acres in extent should be provided, some of which should be cultivated and sown with mangolds, Cape barley, &c., and one with lucerne as a permanent pasture. Some days before a sow was due to farrow, a pen should be provided, with short straw for bedding. The straw was essential, because the sow would commence making a bed sometimes a week before farrowing, and would pull it down and make it up again a number of times. All sows should be booked at time of hog service, and a note made of the time of farrowing. If that were neglected pig-breeding might as well be abandoned. The sow should be fairly fat when she farrowed, because, no matter how well fed, a good milker would lose flesh rapidly when raising a litter. Young pigs should be encouraged to drink early by providing a trough or dish which they could get at easily. That would teach the young to forage for themselves, and relieve the sow of the continuous drain on her system. Young pigs which commenced to feed early could be weaned at six weeks; otherwise they should be left on the sow a couple of weeks longer. The practice of weaning at four weeks was to be deprecated, because it impeded development and sometimes ruined the animals entirely. Where water was abundant, a bath should be constructed in some convenient and shady spot. Concrete, with cement facing, would make a fairly cheap bathing hole. The excavation should be about 16in. deep, with sloping sides. That could be easily flushed out whenever cleaning was necessary.

PORT ELLIOT (Average annual rainfall, 20.33in.).

October 21st.—Present: five members.

DOES MANURING FRUIT TREES PAY?—In a paper which put that question Mr. W. E. Hargraves arrived at an emphatically affirmative conclusion, as the result, he said, of three years' experimenting. He had been asked by the Branch to undertake the task and make a report. The trials were made on four trees of each of the following kinds of apples:—Jonathans, Winter Permains, Cleopatra, Dunn's Seedling, Lord Nelson, Red Aberdeen, Irish Peach, Garibaldi, Emperor Alexandra, Rome Beauty, Rokewood, and Strawberry Pippin. He also treated five pears and plums. One of each variety was left without any manure. The difference was very marked in those which had manure; not in every case with regard to numbers, but the quality and size of fruit on the manured trees were very marked. From the unmanured trees, it required, on an average, 200 to 220 to fill a bushel box, but the average of those from the manured trees was about 130. The best time to use stable manure was in June, when it should be spread round the trees and then ploughed in about July. Bonedust and superphosphate should be placed around the trees a week or two later, and dug or hoed in. The best of all manures was blood from the slaughterhouse. For the first five trees (one not manured) he dug three holes about 1ft. deep at equal distances apart, about 3ft. from the trunks, and put about a gallon of blood in each hole, and filled up with soil. All weeds were kept down. In the second year, the same five trees had ½lb. of mineral and ½lb. of guano super. each. In the third year the same trees had a barrow load of peat and a few shovelfuls of lime and wood ashes. In the second lot of five

trees (one not manured) the first year a wheelbarrow full of stable manure (made with seaweed for bedding) was dug down, and a few weeks later a few handfuls of salt sprinkled around the roots, and was washed into the soil by the rain. The second year those trees had 1lb. of potash and a few shovelfuls of fowl manure, and in the third year a wheelbarrow load of peat marl and goose manure mixed and dug in around each tree. In the third lot of five trees (one not manured) for the first year two harrow lands of seaweed were spread around the trees and left for some time, then ploughed in, and a few weeks later 1lb. of guano super. was sprinkled on top and hoed in. The second year ½lb. of potash with goose manure and wood ashes were applied, and in the third year stable manure and lime were ploughed in and 1lb. of mineral super. hoed in around each tree. In the fourth lot of five trees (one not manured) for the first year one bag of sheep manure and a few shovelfuls of lime were supplied to each tree. For the second year a few shovelfuls of sheep manure mixed with blood and a few weeks later ½lb. of potash were supplied. For the third year a wheelbarrowful of peat and goose manure and ½lb. of mineral super. were used. In the fifth lot of five trees (one not manured) for the first year stable manure made from pea straw which had been used as bedding and a few shovelfuls of lime were applied. For the second year seaweed was laid around the trees for a few months in the summer time, then raked into heaps and burned and the ashes mixed with a few shovelfuls of fowls' manure and spread around the trees. For the third year sheeps' trotters were put down about 3ft. from the trunks of the trees and 18in. deep with 1lb. of bonedust and ½lb. mineral super. per tree. Bonedust was one of the best manures, only it was not so quick in action as other manures, but was more lasting. He had tried many ways and many manures. For larger or better fruit and more of it, it was best to change manures each year. If stable manure was applied one year superphosphate or bonedust should be used the next and then followed with ashes, lime, seaweed, and peat. It would not only pay twice over, but it was very interesting to observe the results. Manure did not compensate for the neglect of cultivation. Manure made weeds grow, and if permitted to flourish they would rob the trees of moisture, etc. The more manure was used the more was it necessary to cultivate the orchard. For the last two years he had been experimenting on two trees, viz.:—No. 1—First year, bag of sheep manure and two shovelfuls of soot; second year, 4galls. blood and a month later 1lb. mineral super. and ½lb. potash. From that tree, in the first year, he gathered 4½bush. of mixed sized apples, and last year 13½bush. of good apples and a few small ones, besides windfalls. No. 2—First year, bag of sheep manure and a few shovelfuls of lime; second year, 1lb. potash, ½lb. guano super., and ½lb. mineral super. That tree yielded 10½bush. in two years, against No. 1 tree 18½bush., showing 8bush. in favor of blood manure, which in the two years, at 2s. 6d. per bushel, amounted to £1 on the No. 1 tree. Most of the dressings, such as mineral super., bonedust, ashes, lime, fowl and goose manure, seaweed (both fresh or burnt), soot, marl, &c., would show a profit of 50 per cent. over unmanured trees. But blood manure, stable manure, sheep and cattle dung and peat mixed with potash would show a profit of 80 per cent. to 90 per cent. The fruit was larger and of better flavor, and worth 1s. per bushel more than the produce of unmanured trees. And the trees grew strong and healthy by using sufficient manure. The manure should be put on in early winter, and the land should be cultivated to keep the moisture in the soil. Seaweed burned and the ashes spread around the trees seemed to act like potash. He intended to use it in the place of potash, which was very expensive, and difficult to obtain since the war. We are told that science has been defined as knowledge of natural laws derived from a knowledge of facts. If it is so or not I am not going to say, but I do say manuring fruit trees in a scientific way is a knowledge that no fruitgrower should be without. He was sure that they could feed their trees and make them produce 100 per cent. more fruit, and he was not going to stop experimenting until he could tell the Branch that he had done so. If it had not been for the dry seasons in the past, he would have been able to have done so that day. He was experimenting on a few trees in what he called subsoil manuring, and would report next year. His method was to make a few holes about 18in. from the tree, with a crowbar, about 18in. deep. He then put about 4in. of sand into the holes, and filled up 6in. or 7in. more with bonedust or super., covering that with sand or dirt. That should enrich the subsoil and cause the tree roots to go down into the clay, thus enabling the tree to stand the dry weather better.

STRATHALBYN (Average annual rainfall, 19.28in.).
December 5th.—Present: 22 members.

DAIRYING.—Suitable country for dairying should be capable of growing an abundance of maize, sorghum, &c., observed Mr. A. Burgess in a paper on dairying, or else, he continued, in a locality where irrigation could be carried to lucerne plots to ensure a supply of green feed all the year round. That was essential to heavy milking and to keep the cows in good health. An ideal spot for growing maize and sorghum was where there was an overflow from a creek or river each year. That was much better than irrigation by means either of engines or windmills. In the selection of cows there were several points to be considered, different localities suiting different breeds. A good cow should have plenty of udder room, a nice square udder with large milk veins, thin neck and tail, and be straight along the back, wide between the eyes, and of good temper. Her milk should test at least 4 per cent. of butter fat on an average milking, and measure over 3galls. per day for butter-making. If milk were the objective the deepest milkers, so long as they yielded milk testing over 3.2 per cent., were recommended. He preferred the Holstein-Jersey cross, the Holstein being a heavy milker, and the Jersey yielding milk very rich in butter fat. Another good cross was the Shorthorn-Ayrshire. Those calves were better for fattening for market than the Holstein-Jersey cross. Bulls for stud purposes should be pure-bred, and from a heavy milking strain on both sides. The farmer should breed his own heifers. By so doing he was able to sell some of his older cows each year and still keep up the herd by selecting the best. The Babcock milk tester was the surest way to ascertain the quality of the milk yield. The cowshed should be paved with bricks and given a thin wash of cement. It should have a drain at the rear of the bail, and a cemented pit at the end of the shed for all refuse. The shed should be hosed out daily, and have a slight sprinkling of lime dusted over, to ensure cleanliness. Milk would more quickly absorb an odor than any other liquid. At milking time the cows should be quietly handled. An excited cow would not give her milk freely. Fast milkers were preferable. Care should be taken to strip the cows properly, because the last of the milk contained most of the cream. The milk should be kept as nearly as possible at the same temperature as when taken from the cow until it was separated. Then the cream should be cooled off. On no account should it be mixed with the staler cream while warm. The mixing should be done thoroughly. For churning, the cream should be ripe, and not above a temperature of 62deg. When, in the course of churning, it began to break into lumps about the size of large shot, the buttermilk should be drawn off and brine put in the churn, which should then be turned for another five minutes. The butter would then be ready to put through the worker. The salt should be sifted and mixed while the butter was being worked and washed, half an ounce of salt being allowed for every pound of butter. The separator and dairy utensils should be scalded immediately after use, a little soda also being used. The separator room and dairy should have cement floors. Separator milk, when cool, mixed with a small quantity of pollard, made an excellent pig food. Calves, if fed in the same way, would fatten very quickly, and would not scour as they did on separator milk alone. Before feeding, the froth should be skimmed off the top of the milk.

LUCERNE-GROWING AND IRRIGATION.—Mr. Frank Abbott read a paper on lucerne-growing and irrigation. He recommended sowing 12lbs. to 14lbs. of seed to the acre. The seed should be harrowed in, and then rolled. The ground should be kept in fallow for 12 months before sowing to kill all weeds. A tank stand 15ft. in height, should be erected to carry a tank, from which the pressure of water would ensure a good sprinkle.

WOODSIDE (Average annual rainfall, 31.95in.).
November 8th.—Present: six members.

ENSILAGE.—Ensilage, said Mr. John Hutchens in a paper on that subject, was not only good for cattle, but was a sure preventive against dry bible. Any crop or grass which stock would eat in its green state, they would also eat readily as ensilage. The dandelion made excellent ensilage, and could be made in wet weather when it was impossible to make hay. If early crops were sown ensilage could be made before the hay harvest commenced, and the land could be ploughed ready for another crop, such as maize or sorgbum, or as fallow for next year. He had

just put two acres of barley in a pit, and had ploughed the land again ready for another crop. All crops cut for ensilage should be as nearly full grown as possible without being in any way dry. If cut too soon the sap was pressed out, and if too dry there was not sufficient sap to keep the temperature down. Ensilage should be carted as soon as possible after being cut, and making continued until the pit stack was completed, when the weights should be applied. He used about two tons of weights in a pit 9 x 9. Usually he got sweet ensilage on top of the pit and sour at the bottom. There was no more labor in making a ton of ensilage than a ton of hay, except the weighting, and the extra labor would be repaid in the better health of the cows and the reduction of the bran bill, because cows required either bran or green feed to keep them in health, and there was nothing better or cheaper than ensilage.

HARTLEY, November 8th.—Mr. H. Cross propounded the question, "Does the small farmer try to grow too much wheat?" He answered it in the affirmative. A farm of 100 acres, to grow wheat, would require six horses and a quantity of up-to-date machinery, as much practically as on a large farm. If instead of wheat growing, dairying were carried on, only three horses would be required and very little machinery. After a small farmer had paid for the upkeep of his horses, machinery, and cornsacks very little was left. If six cows were kept, a couple of breeding sows, and about 200 head of poultry, the results should be satisfactory. Every farmer should have a small plot of lucerne, which the cows, pigs, and poultry thrived on. Thorough attention should be paid to these classes of stock to derive the most profitable results from them. Discussion ensued in which it was conceded that produce grown on a small farm showed the most profit if fed to stock. The suggestion that the crop should be harvested by contract was met with the answer that it was difficult to get the work done at the most suitable time.

KANMANTOO, December 9th.—Mr. W. C. Mills read a paper on lambing ewes and the poisoning of foxes. He said that oats were the best milk producers. They were easily grown, and were little trouble to feed to ewes whilst lambing. Discussion ensued, in which the opinion was general that from the middle to the end of April was the best time for lambing in that district, provided that there was a good supply of fodder for the ewes prior to lambing.

MOUNT BARKER, November 3rd.—Members of the Murray Bridge and Mypolonga Branches paid a visit to the Mount Barker Branch, and were entertained at lunch and afternoon tea. The local tannery, Messrs. Pope Bros'. farm, Mr. L. Cowan's property at Blakiston were visited, and other crops were inspected en route. A most profitable and enjoyable day was spent, and the Mount Barker Branch was invited to pay a return visit in March next.

PORT ELLIOT, November 18th.—Mr. Hamilton Welch delivered an address on dipping sheep, recommending that the dipping should take place about a week after shearing. The sheep should be carefully mustered, especially in scrub paddocks, and, if necessary, a second dip should be given. Cool weather should be selected for dipping, and the sheep should not be thirsty, especially if the weather were warm, in order to avoid any risk of the animals drinking the dip mixture. The directions on the packets of dip mixture should be carefully followed, and there should be plenty of water in the dip to ensure that each sheep could be easily immersed. After dipping, the sheep should be placed in pens with concrete floors inclined towards the dip in order that the drippings might run back. The sheep should be kept in the pens until fairly dry, because the drippings would poison grass. Sheep should be examined for tick every three months.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

November 6th.—Present: eight members and two visitors.

INCREASING SOIL PRODUCTION.—"Are our farms as productive and profitable as they should be?" was the theme of a paper by Mr. T. F. Gratwick, who urged

that if the land were held in tenancy, on the same terms which prevailed in England, namely, an annual rental on the value of the farm, where, if land were worth £30 per acre, the rental would be 30s. per acre, then they would realise that the cash returns from their lands were not as high as they should be. If a farmer in that district could not pay 30s. per acre rental and make a profit, then either the value put on the land was too high, or the land was not farmed as well as it should be. The rent of 30s. per acre, compared with rentals paid in other countries and even in other parts of the Commonwealth, was not high. In the Western District of Victoria up to £4 per acre was paid, but they had better markets, and possibly their land was superior. In England, where much of the land was mountainous, 30,000,000 sheep were maintained. It seemed as if there was something to learn in that line. The statement was frequently made in that district that the land was becoming exhausted; but last year 400,000 acres were under crop for potatoes in England and Wales, and the yield averaged 7 tons per acre. In those countries potatoes had been grown for several hundred years, and the yield per acre was three times as great as in Glencoe, an indication that the fault in that district was rather with the farmer than the farm. If properly treated, land could not be exhausted, and the decreasing yields in Glencoe indicated that there was something wrong with their methods. The yield and quality could be improved if more care were exercised in the selection and keeping of seed, a proper system of rotation of crops adopted, and, lastly, the crops were properly manured. Manuring was a matter for experiment, and should be undertaken by the Agricultural Department, though individuals might do something in a small way. Good results had been obtained from peat soils by the application of super. when the potatoes were planted, but in Glencoe he doubted if that system would succeed, because the potato, finding an abundance of plant food immediately surrounding the set, had no necessity to develop an extended root system, and made very rapid growth for the first few weeks; but when the dry spell, which occurred every summer, arrived, the plant displayed fewer drought-resisting qualities than the unmanured crop, because of its cramped root system. If the root system had been developed in search of plant food, as in the unmanured crop, it would also have obtained additional moisture from the same source. The result was that the crop without manure gave a better yield than that which had been manured. In the peat swamp, there was usually a sufficiency of moisture and lime, and hence the satisfactory results from the use of super. Without having made any experiments, he was of opinion that it would be profitable to drill bonedust, blood manure, or super. on the fallow and work it well into the soil some time before the crop was planted. That would promote the extension of a good root system in search of the plant food scattered through the soil, and would ensure a steady development throughout the whole growing period. The succeeding grain crop would also derive some benefit from the fertiliser not absorbed by the potatoes. To secure the full benefit from manures, they should be combined with deep and thorough methods of cultivation. Experiments by the Victorian Agricultural Department demonstrated beyond doubt the benefits derived from the use of immature seed. The use of manures also returned a profit, in some cases considerably in excess of the cost of the manure. In regard to general farming, he quite agreed with the opinion that there were too many weeds on their grass paddocks. There was too much sorrel, Cape weed, thistles, and silver grass, and insufficient English grasses and clovers. The easiest way to improve the pastures was to use more artificial manure with the grain crops, which would result in heavier yields of both grain and grass. There should be a small paddock of lucerne on every farm. With the improvement of the soil, the stock would also improve.—Mr. A. Dow said that the dry summers of the past few years were responsible for the low yield of potatoes. England's big potato yields were the outcome of the application of large quantities of farmyard manure, in addition to artificial fertilisers. Mr. A. Murray said that farmers on the higher-class land near Melbourne, by intensive cultivation, carried more stock than in that district. Mr. J. Dow said that he had tried manuring potatoes, but without success. He had found it impossible to establish lucerne without a heavy dressing of farmyard manure, except on new land. Mr. L. Flett said that weeds were the worst evil to contend with in establishing lucerne. Mr. W. Noolan, jun., said that in the latter district farmers used a single-furrow disc plough and tore up the land as much as possible, and although the soil was of light sandy nature, lucerne grew well. Mr. J. T. Halliday would plough the land three times in preparation for lucerne, and sow the seed in September, using ½bush. of barley and ½bush.

of oats as a cover crop, and then broadcast the lucerne, using a bush harrow afterwards. A good wind would cover the seed sufficiently without harrowing. Lucerne was a deep-rooted subsoil feeder, and therefore did not impoverish the surface soil.

KONGORONG.

December 5th.—Present: 11 members.

How to Grow Grain Crops Successfully.—In a paper dealing with the successful growing of grain crops and the method of disposing of them when grown Mr. Ernest Adams said that the first essential for good crops was clean land. A third portion of the arable land should be fallowed each year. The land should be ploughed, when wet, to a depth of 5in. or 6in. The disc harrows or spring-tooth cultivator should be used in hot weather before the seeding of the weeds. Before cropping commenced the land should be ploughed lightly and harrowed. The most profitable grain crops were oats and barley, but the best profit was obtained by crushing the grain and feeding it to pigs. Ten bushels of crushed grain put more flesh on pigs than 15bush. of whole grain. Pigs, to be profitable, should be ready for market at six months. They required a warm, dry place to sleep in. Oats should be cut very green, and they could be cut with a grass mower if necessary. The oat hay should be fed to cows when the grass had gone off, which would be more profitable than growing hay for chaff or growing oats to sell the grain. Mr. W. A. Aslin said that it was profitable to purchase stock in winter and improve or fatten them when other people had not the feed. He was averse to deep ploughing, because it raised too much of the poor subsoil to the surface. Pigs fed on whole barley did well if the grain were scattered on the ground. Mr. C. Kemp said that his stock ate loose hay, and did not leave a straw. Mr. C. T. Atkin preferred green hay, loose, but the cows would eat hay cut ripe and scattered. Mr. F. R. Uphill preferred oats to barley for feed. Mangolds should not be fed to pigs unless cooked, as it was liable to cause their death. Mr. F. Kemp said that pease were the best food for pigs. Mr. W. A. Aslin said that the trouble was to harvest the pease. Mr. E. G. Morrison said that pease, if sown with oats, would stand up to be cut with a grass mower. Mr. C. S. Atkin said that there was an attachment which could be applied to mowers to cut pease.

Tagasaste Hedge.—Mr. C. Kemp, in a paper on tagasaste, or, as it was commonly called, tree lucerne, said that it was a very quick grower, and when once it was well started was very hardy, and kept green all the year round. He dug a trench 3ft. wide, on the weather side of a field of oats, and planted tagasaste seed, after he had scalded it well to assist germination. The oats crop sheltered the young plants which grew with the crop. In 12 months the hedge was higher than the fence, and it had been a simple matter to keep the hedge trimmed with a pair of shears. At the same time as he planted the seeds, he also put in some strong healthy plants, but they had not thrived nor grown as well as the seeds. By planting very thinly and trimming from the bottom, a very shady tree was obtained. Stock readily ate tagasaste, and therefore it should not be planted where they could reach it. During the drought, those who had tagasaste found it a splendid fodder. Mr. T. Dixon said that it was best to sow tagasaste in two rows about 6in. apart. Mr. C. T. Atkin said he preferred to sow seed, but he had done well with plants. He was averse to a thick hedge for either vegetable or fruit garden. Mr. A. C. Gust said that, in his experience hedges should always be grown from seed. Members generally agreed that it would be profitable to plant waste or poor lands with tagasaste as a shelter and standby for feed.

NARACOORTE (Average annual rainfall, 22.60in.).

September 9th.—Present: 21 members.

Laying out, Care, and Supervision of Experimental Plots.—A paper was read by Mr. E. S. Alcock (Inspector of South-Eastern Experimental Plots) on the above subject. He laid special emphasis on the necessity for care and accuracy in all work associated with the experimental agriculture, and suggested that where time was limited on the farm, rotation tests should be conducted. Three or four varieties, such as wheat, peas, oats, mangolds, or potatoes could be tried; the oats

being sown first and then wheat, followed by the peas, and the potatoes and mangolds being left for the spring. The cereals would, of course, be harvested at the usual time. As to manurial plots, half an acre would be sufficient, and it would not take up a large area to experiment with a number of manures. He favored long and narrow plots rather than square ones, as in the former they would be likely to get more land of the same character on an equal basis. Another point they had to keep in view was the depth of the ploughing for the various cereals experimented with. Manurial plots need not be fenced off separately, but in the case of rotation plots each would have to be fenced off separately. It was handy to have the plots near the homestead, as they were likely to receive more attention and be under more regular observation. In measuring plots, accuracy was essential to ensure correctness in respect to the ultimate results. They had to allow a certain amount for stock reaching over the fences. It was essential, he urged, to have the boundary fences wire netted to keep rabbits out, and to prevent stock from feeding inside. Another thing they had to contend with was wind, and therefore they had to plant trees for shelter, such as gums, wattles, pines, &c. The cultivation should be done carefully and thoroughly, particularly the ploughing and harrowing, and as far as could be arranged on one system. They should plan out the work before beginning, and do everything on system and method. Care should be taken at seeding time, and everything should be measured or weighed. They should arrange their drill carefully, and see that the super. and seed went through it properly and evenly. In the harvesting of the plots it was necessary to use the same care, and see that everything was weighed or measured and tabulated carefully as each operation was performed. He liked the strippers and winnowers for harvesting plots in preference to the harvester. With the harvester it was almost impossible to get the machine empty without considerable loss, unless they went to great trouble. The most complete way, however, of harvesting plots of cereals was by the binder and thresher. The latter was the plan adopted at Roseworthy and Kybybolite. By that means they were able to tabulate the results of grain and straw. Directly the produce was taken off they should mark each bag as it came off the machine, with raddle or pencil, so that the results could be readily seen. In connection with grazing plots they had also to be careful about tabulating the dates. They should keep records of the number of stock and the dates on which they were put on a field plot to graze and when taken off, and their condition, &c. In the case of sheep, they would work out the value of the wool yield per year, and thus they had a basis for obtaining the value of the grazing. In connection with plots it was very necessary to keep a diary, in which each day's work should be entered, and observation notes kept. That would be found useful in tabulating the results at the end of the season. In reply to questions, Mr. Alcock said that the variety of wheat which had proved the best at the Kybybolite Farm by experiments was Federation, and then came White Tuscan and White Essex. A wheat that had done very well, so far, was Queen Fao—a hybrid raised by Mr. Spafford, the Superintendent of Experimental Plots for the State. Other wheats had been experimented with with varied success. In connection with oats their results had not been so definite, as they had struck two or three bad years, and therefore he would not like to recommend any particular variety as yet for that part of the South-East as being more particularly suitable. Before they could draw any definite conclusions from results it was necessary to conduct the test for at least three or four years. A wheat that had stood out very well in plots was a variety named John Brown, but in the field it did not yield well. The oats that had done the best with them were Ruakura, Algerian, Tartar, and Sunrise. They were at present experimenting at Penola, Mount Gambier, and other places in the South-East with something like 14 varieties of barleys and oats that had been found good yielders in New Zealand. They required in the South-East some better yielding oats than they were accustomed to raise crops from. The Algerian was low in yielding, and they thought that by trying some of the good yielding New Zealand varieties they would strike something that would suit the South-East better as a yielder. In white oats it was necessary to sow heavily—4bush. to the acre—as they grew coarse and it was necessary to keep them down by feeding. The quantity was put in in one drilling. He would advise the sowing of the Algerian variety very early. He would not recommend sowing in August as a rule, and he believed sowing early and feeding off was safer. In reply to a question about the feeding off of cereal crops, he said there was one drawback in feeding off and that was that, as a rule, sheep did not touch the rank portions and confined themselves to the short stuff.

NARACOORTE (Average annual rainfall, 22.60in.).

November 11th.—Present: 28 members.

DISTRICT GRASSES AND THEIR RELATIVE FEEDING VALUES.—Many of the grasses in that district were not indigenous, observed Mr. A. B. Feuerheerdt in a paper on grasses in the district and their relative feeding values, but had been introduced from various parts of the globe and become acclimatised, therefore he proposed to treat them in that paper as indigenous grasses, and would endeavor to give some information on their habits and relative feeding values. On their varied soils, ranging from heavy flats or plains, which became periodically inundated, to higher loamy lands and sandy ranges, were to be found a large variety of grasses, both indigenous and naturalised, growing under conditions which they each required, and many might be found growing upon wet and dry lands alike; in such cases they were grasses which had gradually become acclimatised to suit their varied conditions. The greatest variety of any one particular family of grasses was in the clovers and trefoils, there being something like 150 varieties; yet, strange to say, not one of them was indigenous to Australia, two only coming from America, and the remainder from Europe, and in that family were to be found varieties which would thrive in almost any conditions found in Australia. Clovers were not only most nutritious grasses, but also most valuable in increasing the fertility of the soil, through that peculiar faculty they possessed of collecting the nitrogen from the atmosphere and transmitting it to the soil. The small nitrogen nodules might be seen adhering to the roots of clovers, and so it was obvious that the heavier the crop of clover the more fertile did the soil become, and it should be their endeavor to increase the amount of clover growing in their pastures. No plant responded more rapidly to an application of superphosphate; it invigorated the plants, and in turn the production of nitrogen was increased and also the production of seed. That no clover existed before the land was treated by super. was a fallacy. It was simply the stimulating effect of the chemical manure which invigorated the small plants which were growing there in a stunted condition. He would strongly advise the cultivation of the clover family on either high or low country, loamy or sandy. It was particularly valuable to the farmer, for in collecting the nitrogen from the atmosphere, it stored the bacteria in such a form as to become available to all plant life. It had been estimated that ploughing under a three-ton crop of green clover returned to the soil 40lbs. of nitrogen, 8lbs. of phosphoric acid, and 34lbs. of potash per acre. The roots also added humus and made the soil more friable and opened it up, thus allowing for a freer passage of air. Therefore, besides being a soil builder, clover, either in the pasture or cured for hay, was a valuable feed for all classes of stock, and he had no hesitation in saying that where clover would thrive almost any other grass or cereal would thrive also. Among the numerous varieties he would confine his remarks to those which might be found growing in that district. *Trifolium procumbens* (yellow or hop clover) was best suited to sandy soils. *T. resupinatum* (strawberry clover), a good pasture plant, though somewhat small, thrived on both sandy and loamy soils not subject to inundation. *T. fragiferum* (perennial strawberry clover) adapted itself to much wetter conditions than the former. *T. hybridum* (alsike clover) best suited to swampy conditions or irrigation. *T. incarnatum*, one of the best for sowing on stubble land, came away early, and possessed good fattening properties. *T. medium*, red (zig zag, or Mount Schank clover) thrived best in calcareous soils that were not too wet. *T. ochroleucon* (pale yellow clover) required similar conditions to the former. *T. pratense* (red clover), one of the best for permanent pastures, preferring rich calcareous soils, well drained. *T. repens* (white clover, also called Dutch clover), valuable in the pasture, preferred moist soil, but would shoot out again on dry land after the first rain. *T. subterraneum*, a most valuable species, which would become more extensively grown as its qualifications became more generally known; it thrived equally well on clay or sandy soils, providing they were well drained; all stock would eat it greedily, and fortunately Nature had endowed it with one of her many wise provisions—that was, a peculiar faculty of burying its seed panicles, and thus preventing the plant from becoming entirely extinct. Burr clover, the last on the list, but perhaps the one which they were most familiar with, was found chiefly on stiff, heavy land which was not subject to inundation; a good fodder plant in its green stage, and through its prolific seeding propensities affording a considerable amount of food when dry. Unfortunately, owing to the tenacious formation of the seed pods, it clung to the fleeces,

and so decreased the value of the wool; personally he would sooner lose 2d. per lb. on the wool than be without that clover in his fields. Closely allied to the clovers was the melilotus family, one of which best known was often called Californian lucerne. It was of poor feeding quality, and not worthy of cultivation in that district, yet the same plant on King Island, in Bass Strait, was claimed to have converted into a very reproductive country what was formerly considered to be almost worthless land. It was there known as King Island melilot. It was fibrous and bitter, but he was not adverse to seeing a little of it mixed with the hay crop, for it imparted a very pleasant odor to the hay. That closed the list of leguminous plants, and they should receive every encouragement to disseminate them through the fields and pastures. Perhaps their best indigenous general utility grass was one known as barley grass. Two species were found growing in that district; one growing upon the wet or plain country, and the other upon the banks or hills, the latter being somewhat coarser than the one found on the lower lying country. It was the first and earliest feed to start after the rain, and thrived particularly well if the land had been somewhat flooded, and its growth was not retarded by the most severe frosts. It was especially good for lambing ewes, and kept green well into the spring, when it ran up to seed. It had one slight drawback—that of setting up a certain amount of irritation where the dry seed sometimes lodged in the jaws of sheep and around the gums of horses. That variety found upon the high land was similar in habit and growth, but less succulent. Another of their earliest grasses was one commonly, but erroneously, called dandelion. It was an introduction from Cape Colony, and should be called Cape weed. It thrived equally well on all high ground. It started with the first rain, and died off with the first appearance of summer. On the whole it was an undesirable plant of poor feeding quality and suppressing grasses of more value. Horses grazing on sandy land were apt to become sanded through licking up the dry plants after they had died down. The true dandelion was an introduction from England, and two varieties were to be found growing in their pastures—one with rather a prostrate habit, preferring sandy soil, and was much inferior to its taller growing brother; they were both at their best during the spring and summer. They might be recognised by their yellow flowers. They belonged to the same family as the thistles, and had the same milky juice peculiar to that order of plants. Another of their earliest grasses was spear grass, or black prairie. That came up with the first rain and furnished an abundance of green feed until the warm weather arrived, when it died off. It was a very heavy seeder, and if cut at the right period it made very useful hush hay. That grass, however, would only thrive on high dry ground, and grew equally well on both loamy and sandy soils. The wild oat was also an introduction from Europe, and was the original parent from which all commercial oats had emanated. It was fair feed for sheep in its earlier stages, but it ran up and became stemmy, when it was best suited for horses and cattle. It was a valuable adjunct to pastures, but undesirable on cultivated land. Another grass, known as Bromley grass, was an indigenous plant, and in its habits somewhat similar to the wild oat, of comparatively little value until it ran up to seed in the spring, and was then relished by all stock. Wild geranium was not so abundant in their pastures as it should be. It was a very early feed, and grew upon a wide range of soils, and was famed for its fattening propensities. Wild carrot was another useful grass, similar in habit to the geranium, possessing good fattening qualities, and would grow in a wider range of soils and under wetter conditions. Canary grass, as the name implied, was an introduction from the Canary Islands, and it thrived on high and dry lands as well as the wet, moist flats; it was somewhat stemmy in habit, and was relished by all stock. Nut grass was an indigenous perennial; it came with the first rain and grew in low, close tufts, and died down with the first appearance of warm weather. It was easily recognised by its small, hard, nut-like bulbs found at the base of the stems, which increased each year, and from which the new growth started after the first rains. It was an undesirable plant, for where it was found growing other grasses failed to establish themselves. Probably one of the most valuable indigenous grasses was kangaroo grass; it was a perennial, and was found growing upon a wide range of soils. That grass was highly esteemed by the early pioneers, in whose time it was to be found growing abundantly, and horses became fat tethered while grazing upon it. It kept green through the hottest summer weather, but owing to the depredations of the rabbit, and evil of overstocking, it had become almost extinct. Sow thistles were to be

found growing there in several varieties, and the one generally found in the kitchen garden was the best of the family. All stock were particularly fond of it, and it had a habit of starting into growth at all periods of the year. There was another species usually found growing in swampy localities. It was much coarser than the first named, and was somewhat spiny to the touch. Still more spiny was the Scotch thistle, and that plant might be classed as a very valuable addition to summer pastures. It was a biennial, the seedling plants running up to seed in their second year. The blossoms and buds of the plant contained much sugar, consequently it was very fattening, and was eagerly sought after by sheep, horses, and cattle. Besides the Scotch thistle possessing that qualification it was a great enricher of soils, having a long tap root. It derived its nourishment chiefly from the subsoil, and as it died off deposited it on the surface in the form of humus, and at the same time aerated the soil. There were many varieties of that plant, but the one described far excelled all the others. An annual belonging to the same family was known as the shore thistle, and might be recognised by its sage-green color, and its clusters of small pink blossoms. It thrived particularly well around rabbit warrens. It was of scant value as a pasture plant, although after the summer rains had fallen the dry plants were eaten by all stock, cattle being particularly fond of it. Hog weed, or wire grass, was also an introduced plant, and started into growth in the spring. It had a prostrate habit, and was somewhat fibrous, but being green through the summer was relished by all stock. Probably the best summer fattening plant on the plains was generally known as Mother Dutton, or Yankee thistle. It was an annual and thrived best on heavy moist soils, and should receive every encouragement to propagate itself in pastures. That could only be accomplished by light stocking or a periodical spelling in the spring. That also applied to all of the most valuable grasses, for it was only natural when stock had their choice they would seek out the best first, and only pay their attention to the others when the sweeter ones had been eaten out. That plant was also somewhat prostrate in habit until the summer set in, when it pushed out tall, slender stems upon which the seed was produced. There were many other grasses too numerous to mention, which were found growing in their pastures, most of which were insignificant, and of poor commercial value, but no doubt playing their own part in making the pasture as varied as possible. Upon the wet or swampy country were to be found grasses, herbs, rushes, and reeds all growing under the conditions suitable to each. Probably the best was what was known as cabbage grass. It belonged to the family *Tetragonis*, and might be recognised by its flat, succulent, shiny leaves, and its small white flowers; it was prostrate in growth, spreading its branches under and over the ground and rooting as it went along. It was a perennial, and was particularly good for weaners during the summer months. Stock grazing on that weed required very little water during that period. Australian millet, also known as white tussock grass, was also a perennial, and adapted itself to many conditions, wet and dry, from the hummocky sands of the coast to the heavy black flats and swamps. It was somewhat fibrous, and made better feed after being burnt off. It bore heavy seed, and was perhaps best suited to the grazing of horses and cattle. The same treatment also applied to the numerous reeds, rushes, cutting and thatch grass, they being all fibrous, but provided a large amount of rough fodder from the young growth after having been burnt off. On the swampy country of somewhat saline nature were to be found numerous herbages, two of which in particular were very succulent, and provided an abundance of fodder during the summer months. One, known as red weed, was a boon to the district during the period of the late drought. It was wonderfully prolific, and also fattening. In its earlier stages it had a purging effect upon stock, but not to an excessive degree, and that action upon stock at that period of the year no doubt accounted for them thriving whilst grazing upon the herb. The seed was very fine, and was carried about with the dust blown from off the swamps. The other plant, known as samphire, had somewhat the same effect upon stock, but was not nearly so nutritious as the former, and stock would not thrive if they were grazed entirely upon it. In conclusion he again advised the cultivation of the clover family, light stocking to encourage the seeding of the best grasses, and the frequent burning off of all low-lying country, that being the only sure method of destroying the numerous parasites and diseases which that class of country in particular was heir to. Mr. W. H. Smith said that he had a great opinion of subterranean clover, but they had not been told how to sow it. Mr. F. A. Holmes

said that at one time melilotus did well on cultivated land on the plains. Mr. W. E. Rogers said that King Island clover gave them great trouble in the Millicent district, and stock would not eat it, because it was so hard in the stem. Mr. S. H. Shinckel said that stock took melilotus readily when in flower, but when dry it was somewhat woody. Mother Dutton grass had wonderful fattening qualities in February and March. Millet grass used to grow well in the South-East, but it appeared to have been eradicated. A number of clovers which used to flourish in the district had become extinct.

FRANCES, November 18th.—Discussion took place as to the best kind of wheat to grow in the district, and the consensus of opinion was that Federation was the best yielder and that Baroola Wonder occupied second position.

BERSEEM.

Berseem is an excellent winter grower and a crop that makes headway when even oats and barley are dormant. As a greenfeed for poultry it is unexcelled, and all livestock take to it readily. It must be considered as a crop to be irrigated. Seed, which should be distributed at the rate of 20lbs. to 30lbs. per acre, should be sown in March, or at the latest during the first fortnight in April. It should be watered immediately to ensure prompt germination, and the first cut should be taken as soon as the growth is sufficient to permit of this. Subsequent cuts should be as frequent as possible, and in order to ensure best results, an irrigation should follow each cutting.

At seeding a dressing of superphosphate should be applied, and the addition of farmyard manure to the crop will do no harm. Seed can be obtained from the Department of Agriculture, the price being 10d. per lb. (cartage and railage extra).